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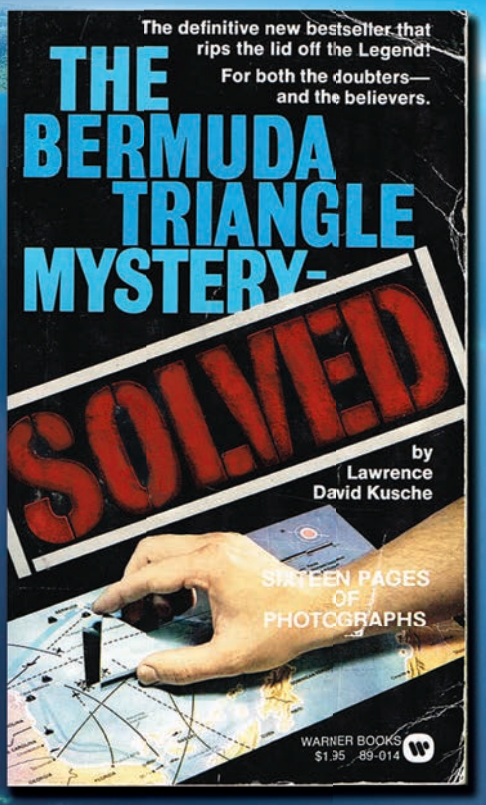
Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Vol. 39 No. 6 | November/December 2015

The Man Who Solved the BERMUDA TRIANGLE 'MYSTERY'

LARRY KUSCHE Looks Back on His Classic Investigation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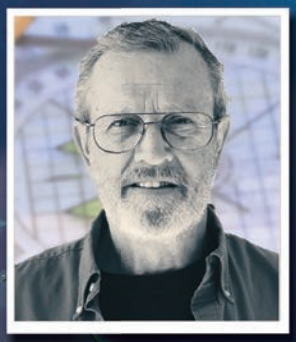

The Search for Negative Evidence

We Are All GMOs

Pseudoscience and the EmDrive

Young-Earth Creationism

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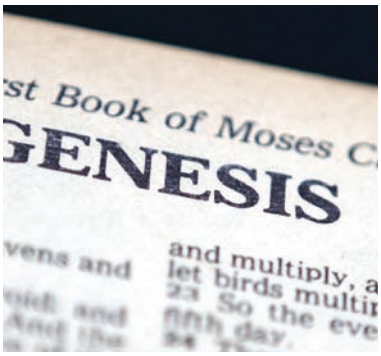

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Committee for Skeptical Inquiry
"... promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims."

The Man Who Solved the Bermuda Triangle 'Mystery'

In a recent essay (SI, March/April 2015), I went back forty years to the events that were stirring the beginning of the modern skeptical movement. One wild claim of the time was the so-called mystery of the Bermuda Triangle, and one landmark event of skeptical investigation was the 1975 publication of Larry Kusche's *The Bermuda Triangle Mystery—Solved*. I wrote that it is "still today regarded (correctly in my view) as one of the classic debunking books of all time." I hasten to add that Kusche prefers not to be called a debunker; he just wants to find out what's true.

Kusche's remarkable book was newly out there, along with others by Martin Gardner, James Randi, and UFO critic Philip J. Klass, serving as examples of how to do critical investigations of popular mysteries. When CSICOP was founded in 1976, Kusche, Gardner, Randi, Klass, and many others became founding CSICOP fellows.

For this issue, we invited Kusche (rhymes with "bush") to give his forty-year perspective, recounting his investigation, the events that stimulated it, and his thoughts about it all. At the time he didn't know what the facts were; he wanted to find out. But once he'd completed the investigation, he called the Bermuda Triangle "a manufactured mystery" and now refers to it as a "delusion."

"The 'mystery' of the Bermuda Triangle is one of the most widespread frauds that has ever been perpetrated," he writes in this issue. "It was based on poor research and distorted, untrue, inaccurate information that was uncritically copied and embellished."

We know that now, but back then, before Kusche's investigation, many people thought airplanes and ships were indeed mysteriously disappearing at high rates in a strangely triangular section of the ocean for reasons unknown.

Kusche brought his skills as an experienced pilot and flight instructor and his university librarian's curiosity and desire to find out and share the truth to what became a remarkable investigation.

Like many legends this one had its origin in a real event: the disappearance of five Navy Avenger torpedo bombers on a flight from Fort Lauderdale, Florida, to the Bahamas on December 5, 1945. Their loss was a huge tragedy. It soon led to wild speculation and unsupported theories. Kusche set out to find out what really happened. His calm, rational approach and his focus on original, not secondary, sources eventually led to a reasonable explanation. He also found that subsequent stories of other "mysterious" losses in the "Triangle" were highly exaggerated, and most losses of ships attributed to the Triangle had determining causes (e.g., severe storms) or even happened nowhere near it.

Scientists and naval officials and historians welcomed his book (we show some of their comments on page 37), and after a time the Bermuda Triangle mystery itself sank into oblivion.

Today, Kusche still lives in the Phoenix area. He is "retired," he says, but extremely busy and healthy for turning seventy-five soon. "I have always worked out, lengthy bike rides, weights, etc." He has been married fifty-one years. He still sees a need for informed skepticism against multitudinous untruths. "In this age of information explosion and social media, it is worrisome that so many people believe so many things without requiring any supporting evidence. . . ."

Kendrick Frazier

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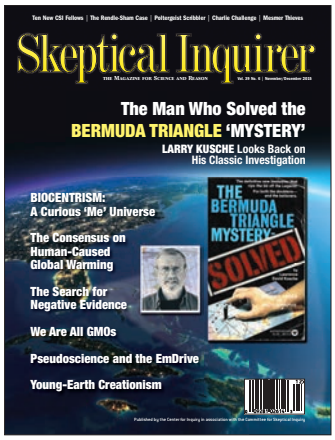
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THE BERMUDA TRIANGLE MYSTERY SOLVED

On the cover (and p. 28): A highly detailed image of Earth showing the city night lights of North America giving way to day in the Caribbean Islands, Cuba, Haiti, and Jamaica. Elements of this image were furnished by NASA.

CFI Calls on FDA to Label Homeopathic Drugs as Untested and Unproven

Consumers spend $3 billion a year on homeopathic drugs, yet most remain unaware that the Food and Drug Administration (FDA) has not evaluated them for safety and effectiveness. In comments filed with the FDA the week of August 17, the Center for Inquiry (CFI) urged the FDA to subject homeopathic drugs to the same testing requirements as conventional drugs. Failing that, CFI urged the FDA to at least require homeopathic products to be clearly labeled as untested and unproven.

Homeopathy is a centuries-old pseudoscience, developed before the discovery of disease-causing pathogens, based on the false beliefs that "like cures like" and that the more an ingredient is diluted the more potent it is, due to water's "memory" of the diluted ingredient. As CFI stated in its comments, "By its own definition, homeopathy cannot work." Yet for historical reasons relating to the passage of the original Food, Drug, and Cosmetic Act in 1938 (which had a homeopathic practitioner as a key sponsor), homeopathic products can be marketed even though they are not subject to the rigorous testing for safety and effectiveness that conventional drugs must undergo.

In late March, the FDA announced it was reconsidering its position on homeopathic drugs. The Center for Inquiry, which advocates for science and reason and is home to the Committee for Skeptical Inquiry, had previously petitioned the FDA to address the inadequate regulation of homeopathic products. It was then invited by the FDA to provide testimony at public hearings on the subject in April (SI, July/August 2015).

Said Ronald A. Lindsay, president and CEO of CFI:

> When people get sick or hurt, they are confronted with countless products that claim to be able to make them better. They cannot be blamed for not distinguishing between effective remedies and pseudoscience from the 1700s if both products share the same store shelves, and there is no labeling on homeopathic drugs to indicate they are given a pass by the FDA. Clear labeling on homeopathic products, that catches consumers' attention and informs them that the FDA does not evaluate these products for safety or effectiveness, is an easy way to ensure that people looking to treat their illnesses are not fooled into thinking that homeopathic drugs are real medicine. Study after study demonstrates that at most they have a placebo effect.

"We believe that true freedom of choice is impossible unless one is fully informed about the choices," writes CFI in its comments. "The public needs the guidance of an expert agency when it comes to buying drugs as they are not in a position to evaluate their effectiveness themselves, without incurring unacceptable risks."

One such risk highlighted by CFI is the risk of those suffering from real medical conditions who might rely on homeopathic products to the exclusion of proven scientific remedies, which can result in people becoming sicker or even dying for lack of real, scientifically proven treatments.

Homeopathy is a centuries-old pseudoscience, developed before the discovery of disease-causing pathogens.

In the meantime, the Federal Trade Commission (FTC) responded to the FDA's requests for public input with its own criticism of the FDA's slack regulatory policies on homeopathy. The FTC complained, among other things, that the FDA's policy guide "does not require that over-the-counter (OTC) homeopathic drugs be approved by FDA as safe and effective if they satisfy certain conditions, including that the product's label contains an indication for use. Yet the policy guide does not require sellers to have competent and reliable scientific evidence to support the indication for use."

The full comments submitted to the FDA can be read at bit.ly/CFI_Homeopathy_FDA.

Ten Distinguished Scientists and Scholars Named Fellows of Committee for Skeptical Inquiry

Ten distinguished scientists, scholars, educators, and investigators from five countries have been elected fellows of the Committee for Skeptical Inquiry (CSI), copublisher of the Skeptical Inquirer. CSI (formerly CSICOP) is one of the world's leading organizations for the promotion of scientific thinking and the critical examination of extraordinary claims from a scientific point of view.

Fellows of CSI are selected for their "distinguished contributions to science and skepticism." They are nominated and elected by CSI's twelve-member Executive Council.

In addition, CSI named four new Scientific and Technical Consultants.

The new fellows join a list of notable CSI fellows that includes astronomers Neil deGrasse Tyson and Jill Tarter; biologists Richard Dawkins and E.O. Wilson; Nobel laureate physicists or chemists Leon Lederman, Murray Gell-Mann, Steven Weinberg, and Sir Harry Kroto; philosophers Daniel C. Dennett, Susan Haack, and Mario Bunge; anthropologist Eugenie C. Scott; psychologists James Alcock, Ray Hyman, Steven Pinker, and Richard Wiseman; magician/author James Randi; science educator and television host Bill Nye; *Cosmos* creator/writer Ann Druyan; plus many prominent physicians and medical scientists who critique questionable medical claims.

The full list of fellows is on the inside cover of each issue of SI and on the organization's website at csicop.org/about/csi_fellows_and_staff/.

Past fellows now in CSI's Pantheon of Skeptics (http://www.csicop.org/about/the_pantheon_of_skeptics/) include Isaac Asimov, Carl Sagan, Martin Gardner, Nobel laureates Francis Crick and Glenn T. Seaborg, Stephen Jay Gould, B.F. Skinner, and philosopher and CSICOP founder Paul Kurtz.

The Committee's newly elected fellows are:

John Cook, Climate Communication Research Fellow for the Global Change Institute at the University of Queensland, Australia.

Krista Federspiel, science journalist, expert on complementary and alternative medicine, Vienna, Austria.

Julia Galef, host of the *Rationally Speaking* podcast; cofounder, Center for Applied Rationality, Berkeley, CA

Stephan Lewandowsky, psychologist, School of Experimental Psychology and Cabot Institute, University of Bristol, United Kingdom

Daniel Loxton, author, editor of Junior Skeptic at *Skeptic* magazine (US), artist, Vancouver, B.C., Canada

Paul Offit, Professor of Pediatrics; Director of the Vaccine Education Center, the Children's Hospital of Philadelphia

Naomi Oreskes, geologist and professor, Departments of the History of Science and Earth and Planetary Sciences, Harvard University, Cambridge, MA

James L. Powell, geochemist, author, professor; executive director, National Physical Science Consortium; retired college and museum president, Buellton, CA

Donald R. Prothero, paleontologist/geologist, Natural History Museum of Los Angeles County, Los Angeles, CA

Stuart Vyse, psychologist, former Joanne Toor Cummings '50 Professor of Psychology, Connecticut College; author of *Believing in Magic: The Psychology of Superstition*, Stonington, CT

The Committee's newly elected Scientific and Technical Consultants are:

Susan Gerbic, founder and leader of the Guerilla Skepticism on Wikipedia (GSoW) project, skeptic activist, photographer

Gabor Hrasko, chairman of the European Council of Skeptical Organizations (ECSO), president of Hungarian Skeptics

John R. Mashey, computer scientist/executive (Bell Labs, then Silicon Valley), analyst of climate-change denial, contributor to *DeSmogBlog* and Skeptical Science, Portola Valley, CA

Julia Offe, neurobiologist, science journalist, creator of German Science Slam

John Cook is the Climate Communication Fellow for the Global Change Institute at the University of Queensland, Australia. He created and maintains the Skeptical Science website, one of the top online sources of information about climate science and climate denialism, and is coauthor of *Climate Change Denial* (2011) and the 2013 college textbook *Climate Change Science: A Modern Synthesis*. He also was lead author of the paper "Quantifying the Consensus on Anthropogenic Global Warming in the Scientific Literature," awarded the best paper published in *Environmental Research Letters* in 2013. He has a BS in physics and is currently completing a PhD in cognitive psychology, researching how people think about climate change. He and colleague Stephan Lewandowsky (also a newly elected CSI fellow) wrote "The Debunking Handbook," a guide about the problems of, and best strategies for, debunking anti-science myths.

Krista Federspiel of Vienna, Austria, is a medical journalist and author with a PhD in folklore. She worked as a freelance journalist and editor for several Austrian and German magazines and newspapers. She also became known as a radio and television presenter. She is a member of the Science Council of the Society for the Scientific Investigation of Para Sciences (GWUP, the German skeptics group) and regularly publishes articles in their magazine, *Skeptiker*. She is cofounder and an active member of the Society for Critical Thinking, the Vienna Regional Group of GWUP. Her focus is on social and women's issues, consumer protection,

medicine, and psychotherapy. Federspiel has become well known as a critic of alternative medical procedures. She is author, coauthor, or editor of a number of books in these fields.

Julia Galef is president and cofounder of the Center for Applied Rationality, a nonprofit think tank that trains people to be more rational. She is a writer, podcaster, and public speaker on rationality, science, and the philosophy of science, often explaining common confusions and popular misconceptions about rationality. She serves on the board of directors of the New York City Skeptics and hosts their official podcast, *Rationally Speaking*, which she has done since its inception in 2010, sharing the show with cohost and philosopher Massimo Pigliucci until 2015. Galef has a degree in statistics and did graduate work in economics before shifting to her present career advocating for science and rationality.

Stephan Lewandowsky is a psychologist whose recent research has focused on the public's understanding and misunderstanding of science and why people often embrace beliefs at odds with the scientific evidence. He is a cognitive psychologist in the School of Experimental Psychology at the University of Bristol, United Kingdom, where he is also part of the university's Cabot Institute. Until 2013, he was at the University of Western Australia. He has published a number of notable studies examining people's beliefs in misinformation, including one of the best-known studies of public opinion about climate change, advancing the literature on what has come to be known as "motivated reasoning." He has also studied the relationship between believing conspiracy theories and rejection of various forms of science. He is the first digital content editor for the Psychonomic Society, running its blog at http://www.psychonomic.org/featured-content.

Daniel Loxton is editor of the Junior Skeptic section in *Skeptic* magazine (U.S.), and a Canadian writer and artist. He is lead author (with Donald Prothero, also named a fellow) of the 2013 book *Abominable Science!*, a scientific look at cryptozoology heralded as one of the best books about the origins of myths about Yeti, Nessie, and other famous cryptids. His book *Evolution: How We and All Living Things Came to Be* won the $10,000 Lane Anderson Award, Canada's top national award specific to children's science writing. His book *Pterosaur Trouble* won the $5,000 Bolen Books Children's Book Prize at the Victoria Book Awards. Loxton has also become a kind of unofficial historian of the modern skeptical movement, with online papers such as "Why Is There a Skeptical Movement?" (2014) exploring the roots, founding principles, and purposes of scientific skepticism.

Paul Offit, MD, is Professor of Pediatrics and Director of the Vaccine Education Center at the Children's Hospital of Philadelphia. He is also a professor of pediatrics and vaccinology at the University of Pennsylvania School of Medicine. Offit is co-inventor of the rotavirus vaccine, credited with saving hundreds of lives every day. He is a leading proponent for childhood immunizations and a prominent advocate for science-based approaches to medicine. His 2008 book *Autism's False Prophets* catalyzed a backlash against the anti-vaccination movement in the United States. His three latest books have extended the range of his critiques even further: *Deadly Choices: How the Anti-Vaccine Movement Threatens Us All* (2011), *Do You Believe in Magic? The Sense and Nonsense of Alternative Medicine* (2013), and, most recently, *Bad Faith: When Religious Belief Undermines Modern Medicine* (2015).

Naomi Oreskes, a geologist turned historian of science, is a professor in the Departments of the History of Science and Earth and Planetary Sciences at Harvard University. She moved to Harvard in 2013 after fifteen years as Professor of History of Science and Science Studies at the University of California, San Diego. Her research has focused on understanding scientific consensus and dissent. Her 1999 book *The Rejection of Continental Drift*, her coedited volume *Plate Tectonics: An Insider's History of the Modern Theory of the Earth*, and other scholarly works established her as a first-rate historian of science. In 2004, her short paper in *Science* "The Scientific Consensus on Climate Change" became widely cited and brought her to her detailed study of climate denialism chronicled in her 2010 book *Merchants of Doubt* (with Erik M. Conway), which documented how a small group of contrarian scientists obscured the truth on issues from tobacco smoke to global warming. It has been widely praised (and also attacked). That book in turn inspired this year's feature-length documentary movie of the same title. Her most recent book (also with Erik Conway) is *The Collapse of Western Civilization: A View from the Future* (Columbia University Press, 2014).

James L. Powell is a geochemist, author, and retired university and museum executive. He is executive director of the National Physical Science Consortium. He received his PhD in geochemistry from MIT, taught at Oberlin College, and served as its acting president. He has also been president of Franklin and Marshall College, Reed College, the Franklin Institute, and the Los Angeles County Museum of Natural History. He also served twelve years on the National Science Board. In 1998 he wrote *Night Comes to the Cretaceous* about dinosaur extinction and the modern transformation of geology. His 2012 book *The Inquisition of Climate Change* is a comprehensive examination of the climate denial movement. His 2015 book *Four Revolutions in the Earth Sciences: From Heresy to Truth* describes how four key scientific discoveries (deep time, continental drift, meteorite impacts, and global warming) were all initially rejected but then accepted by science, confirming science's self-correcting nature. Asteroid 1987 SH7 is named for Powell.

Donald R. Prothero is a paleontologist and geologist associated with the Natural History Museum of Los Angeles County and a prolific writer and author. He received his PhD in the geological sciences from Columbia University. His scientific specialty has been mammalian paleontology. He became involved with the skeptical movement in the early 1980s defending evolution and later serving on the editorial board of The Skeptics Society. His trade books include *Evolution* (2007), *Catastrophes!* (2011), *Reality Check: How Climate Deniers Threaten Our Future* (2013), *Abominable Science!* (with Daniel Loxton, also a newly elected CSI fellow), and *The Story of Life in 25 Fossils* (2015). He's also written six geology textbooks, including *Evolution of the Earth*, in its sixth edition. Recent awards include the Shea Award (2013) for writing in geoscience and the Gregory Award (2015) for service to vertebrate paleontology.

Stuart Vyse is a psychologist and the former Joanne Toor Cummings '50 Professor of Psychology at Connecticut College, where he was praised as an engaging teacher. His research specialty is irrational behavior. His book *Believing in Magic: The Psychology of Superstition* was winner of the William James Book Award of the American Psychological Association. It is an account of the science behind our most irrational beliefs. Oxford University Press published an updated edition in 2014, with Vyse adding new research on jinxes, paranormal belief, and luck, and making a renewed call for scientific thinking and the naturalistic explanation of the world. Late last year, Vyse began writing a regular column, "Behavior & Belief," for the Skeptical Inquirer website, csicop.org. Some notable recent entries include "Neuro-Pseudoscience," "Has Science a Problem?," "Facilitated Communication: The Fad That Will Not Die," and "Anti-Science Trends at Mid-Decade."

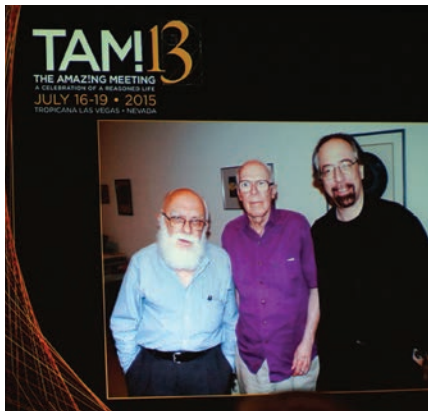
Six Presentations at TAM 13 Celebrate Martin Gardner

Kendrick Frazier All Photos by Brian Engler

Martin Gardner was such a hero to the skeptical community that five years after his 2010 death at the age of ninety-five (the Skeptical Inquirer did a special "Tribute and Celebrations" issue, September/October 2010), celebrations of his life continue. So it was fitting that the 2015 TAM conference (The Amazing Meeting, TAM 13) in Las Vegas July 16–19 devoted six presentations to Gardner and his influence and legacy.

Dana Richards, Martin Gardner's official biographer and a professor of computer science at George Mason University, said Gardner "studied philosophy to find out what he believed." He never lost that thoughtful, philosophical, inquiring attitude. Richards said that in January 1974 Gardner wrote to the publisher Crowell, withdrawing his books because of some errant nonsense they had just published. "The occult revolution is reaching heights of insanity," Gardner wrote in that letter. This, Richards said, was the "the start of a big pushback" by Gardner and colleagues, such as James Randi and Ray Hyman, against the pseudoscientific nonsense soaking culture at that time. It eventually led in 1976 to their joining philosopher Paul Kurtz in founding the Committee for the Scientific Investigation of Claims of the Paranormal, CSICOP (now CSI).

Colm Mulcahy, a professor of mathematics at Spellman College, called Martin "The Skeptic Supreme" and said, "He was, and is, a debunker." He also emphasized Gardner's phenomenal productiveness: he had 101 nonfiction books to his credit. (He showed a photo of Martin next to bookcase full of books all by Martin Gardner, joking that this was Martin Gardner "standing by every word he wrote.") Mulcahy made frequent references to CSICOP and to Gardner's Skeptical Inquirer columns (published from 1983–2002) and the books based on them.



MG's "Champions"
• Magicians
• Trap Door Spiders
• Johnny Carson
• Persi Diaconis
• Penn and Teller
• Randi
Gallant always acquires empirical data from multiple sources before he reports something as factual.
(He reads Scientific American, the Skeptical Enquirer, and Skeptic).

James Randi, Martin Gardner, and Jamy Ian Swiss (top); James Gardner's slide listing his father's champions.

Perhaps TAM's centerpiece speaker on Gardner was James E. Gardner, Martin's eldest son and a professor in the College of Education at the University of Oklahoma. James came to the 2010 TAM conference's special impromptu tribute to his then recently deceased father, but in this 2015 venue he had an opportunity to speak at some length.

Growing up, James knew his dad was "a skeptic *par excellence*," who had a set daily routine at their home at 10 Euclid Street in Hastings-on-Hudson, New York. He had breakfast and read the *New York Times*, then went upstairs to his third-floor office to work until lunch. After lunch he worked again until 4 pm. That was the time he and his wife, Charlotte, reserved for cocktails, and they tried never to miss that hour together even if traveling. Then he returned upstairs to work until dinner, then a bit more work after dinner until bedtime at an early 8:30 pm.

James E. Gardner gave a touching tribute to his father, Martin Gardner, at TAM 13.

James playfully referred to his father's "technology"—typewriter, scissors and paste, and a dial phone. He used an abacus to balance his checkbook. When email came along later, his father did not want it "because he knew he would be even more overwhelmed." (In his later years, however, James did help Martin do some research for his columns on the Internet.)

James listed his father's literary he-

Colm Mulcahy, Dana Richards, James Gardner, James Randi, and Jamy Ian Swiss in panel remembering Martin Gardner.

Simon Singh tells of Martin Gardner's infulence on him as a skeptic.

roes (William James, G.K. Chesterton, L. Frank Baum, and Lewis Caroll) and his "charlatans" (Ted Serios, L. Ron Hubbard, Peter Popoff, Oral Roberts, Uri Geller, and Dr. Oz for his "homeopathic things"). Martin's champions included "magicians," Johnny Carson, Stanford statistician Persi Diaconis, James Randi, and "The Trap Door Spiders," a New York men's literary and arguing club of mainly science-fiction writers that included Isaac Asimov and Arthur C. Clarke.

"Dad wouldn't talk before an audience, but with a typewriter he was direct, truthful, honest."
— James E. Gardner

James referred to his father's famous reluctance to do public appearances but his determination to engage with pseudoscience and other nonsense in print. "Dad wouldn't talk before an audience, but with a typewriter he was direct, truthful, honest."

Philosopher Massimo Pigliucci (like Gardner, also a past Skeptical Inquirer columnist) spoke on Martin Gardner as a skeptic and public intellectual. Pigliucci said Martin "very early on influenced my skepticism" and added, "I think Martin Gardner is a good role model for all of us to aspire to." But Pigliucci quickly went on to emphasize that Gardner "didn't quite follow the party line." For one thing, he embraced the idea of mathematical Platonism, the idea that the universe *is* mathematics. Second, he was a mind "mysterian," which holds that the fundamental nature of human consciousness may not be knowable. (Pigliucci referred to these two positions as "weird, but not crazy.") And third, Gardner was famously a philosophical theist. Pigliucci considered these three attributes, balanced them against all of Gardner's enormous contributions to science and skepticism, and derived three lessons:

1) Skepticism is about honest, critical inquiry. It is an intellectual attitude. It is not about adhering to a list of specific positions.
2) Skeptics can and should be inspired by role models, but role models are not infallible or unquestionable.
3) Skeptics either have to admit that some of their main figures hold questionable positions or limit "skeptics" to a very small group. (Pigliucci made clear he favors the former.)

Another speaker was Simon Singh, the British science writer and skeptic. Like so many others, he never met Gardner, "but he really influenced me." Singh recounted a number of topics where Gardner influenced his writings, such as Fermat's Last Theorem, cryptography, *The Simpsons*, cosmology, and quackery.

A final special treat for the audience was the showing of a video of an interview with Martin Gardner, taped by James Randi and magician Jamy Ian Swiss in Oklahoma on Martin's ninetieth birthday. It was a rare glimpse, in the latter part of his life, of a famously shy and reclusive skeptic, known in person to only a few close friends but who through his clear thinking and penetrating writings shaped two entire generations of scientific skeptics.

James Randi Also Feted at 'Amazing' Meeting

Martin Gardner wasn't the only famed skeptic honored at TAM 13. James ("The Amazing") Randi, who founded the TAM conference series and for whom it is named, was also the subject of 1) a hilarious opening skit created and performed by musician and TAM host George Hrab titled "Randi: The Musical"; 2) a panel discussion with Randi hosted by fellow magician and TAM program member Jamy Ian Swiss; 3) a special Saturday evening reception and series of invited tributes from Randi's friends and colleagues, ending with remarks by Randi himself; and 4) Randi's closing remarks on Sunday afternoon.

Randi turned eighty-seven in August, just after the conference, but seemed his usual irrepressible self throughout.

"Let's say the hell to anti-vaxxers."
—James Randi

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Mysterious Clumps of Worms Line Texas Highways

Benjamin Radford

The deluge that flooded parts of Texas in late May 2015 created a strange sight on a patch of the state's highways: clumps of worms along the center line. Thousands of worms, initially mistaken for discarded spaghetti, were found in Eisenhower State Park in Denison, Texas.

A June 2 ABC News article by Kaylee Heck explained:

> The piles in the middle of Eisenhower State Park were actually worms, Park Superintendent Ben Herman told ABC News. Rangers were checking the back roads of the park in Denison, Texas, found on May 29 when they found the piles lined up in a near-perfect straight line. "We're still puzzled why they decided to line up in the middle of the road," Herman said. "Even our biologist doesn't know why they're spaced so well and in the line."

The fact that the worms came out of the ground isn't a mystery: they can drown in rain-saturated soil. But why did they migrate to the center line on the road, and why did they appear in dozens of discrete, round clumps? The incident left many scratching their heads. What was it? Some unknown force of nature? A worm flash mob?

The answer lies in the fact that the center line of the highway is the highest point in the area (roads are designed with a slight grade to allow for rain runoff). As for the mysterious clumping behavior, Sharon Hill of the site DoubtfulNews.com looked into the case and noted that:

> Actually, research has been done on red wigglers that tend to clump in compost piles. Worms communicate by close contact with [each] other. They may gather en masse when conditions are not quite right or in the open, then move, in a herd, to a safe location.

Because the road was closed due to flooding, the center line was the safest and driest place for the worms to be.

This isn't just a piece of animal folklore; a 2012 study published in open-access online journal *PLoS-ONE* titled "Self-Assemblage and Quorum in the *Earthworm Eisenia fetida*" describes "the mechanisms that govern aggregation behavior specially the tendency of individuals to leave or join groups in the compost earthworm *Eisenia fetida*."

It's not clear why no other Texas state parks reported the same event, but there are several plausible explanations. For one thing, different Texas state parks got different amounts of rain and have differing geological and soil conditions. Unless that same type of worm was present in areas with identical conditions, including rain and soil drainage, we might not expect to see other cases. It's also possible that the mysterious worm rings could only have been formed on a closed road; worms in other rain-saturated areas of the state may have attempted the same thing but been crushed en masse by traffic tires long before they could make it to the relative safety of the center stripe and form the unusual clusters. The dead worms would be unnoticed on highways and thus not live long enough to do anything artistic or newsworthy. The worms remained for a few days before returning to the soil without answering questions about their motives.

Benjamin Radford is deputy editor of the Skeptical Inquirer.

Just a couple highlights:

On his recently announced retirement from the board of the James Randi Educational Foundation (JREF): "Retirement. . . . I haven't noticed any reduction in work."

He has nearly completed a new book, *A Magician in the Laboratory*. Only a few more things need to be done before it is ready for the publisher.

Randi wishes he had devoted attention during his career to "the anti-vaxxers," people who deny the enormous medical benefits of childhood vaccinations. "Kids are going to die if these anti-vaxxers get more of a grip on the media." Randi emphasized that he is alive due to medical science, and many people are alive today because modern medicine eradicated smallpox. "Let's say the hell to anti-vaxxers."

"I had an obsession to inform the public" about charlatans and pseudoscientific nonsense and claptrap, Randi noted. "I've put a lot of effort into that. I've put a lot of love into that. . . . I want to get back to work. I can't waste any time."

On advice to future skeptics: "Read anything by Martin Gardner. *Anything.*" He also advised reading Carl Sagan's *The Demon-Haunted World*, the works of Isaac Asimov, and "my books too."

In his closing remarks Sunday, Randi acknowledged and thanked everyone for their supportive words during the conference. "I cannot thank you enough." He acknowledged "a lot of lovey stuff" said about him. "I've had a lot of hugging here," he noted, adding that he likes hugs. "It is time to say goodbye—for the year. *Au revoir.* See you next year. OK?"

Note: Since James Randi's retirement from the James Randi Educational Foundation (JREF) earlier this year, the JREF board has been considering how to continue the foundation without his direct involvement. On September 1, the JREF board announced that it will convert the foundation into a grant-making foundation. The announcement can be read at http://web.randi.org/home/jref-status.

Study Casts Doubt on Omega-3, Antioxidant Brain Benefits

Benjamin Radford

Omega-3 fatty acids—found naturally in a variety of foods including walnuts, edible seeds, and fish oil—are important for the body's metabolism. In recent years companies marketing vitamin supplements have touted omega-3 and antioxidants as important for maintaining brain health and preventing cognitive decline in later years.

However, a large clinical trial conducted by the National Institutes of Health and published in the *Journal of the American Medical Association* (August 25, 2015) casts doubt on those claims. In one of the largest and most comprehensive studies to date, nearly 4,000 patients were randomly assigned to one of four groups, including one that received a placebo.

The average age of the participants was seventy-three, and nearly 60 percent were female. After testing for changes in cognitive function (first to establish a baseline for each patient and then at two-year intervals) the researchers concluded, "There were no statistically significant differences in change of scores for participants randomized to receive supplements versus those who were not." Since the patients did the same with or without the omega-3 and antioxidant supplements, there was no effect.

According to lead author Dr. Emily Chew, "Contrary to popular belief, we didn't see any benefit of omega-3 supplements for stopping cognitive decline." Though this study casts doubt on the benefit of omega-3 supplements for older patients seeking to slow cognitive decline, younger patients may (or may not) benefit from them. There is some research demonstrating that people who eat diets rich in fish and antioxidants have better brain health, but it's not clear whether there's a cause-and-effect relationship. It is possible that people who have healthier brains for other reasons (such as lifestyle habits or genetics) also are more likely to eat fish-and antioxidant-rich diets.

The study, by the Age-Related Eye Disease Study 2 (AREDS2) Research Group, is titled "Effect of Omega-3 Fatty Acids, Lutein/Zeaxanthin, or other Nutrient Supplementation on Cognitive Function: The AREDS2 Randomized Clinical Trial."

Stephen Hawking Lends Fame to New SETI Search

ANDY RAIN/EPA/Newscom

Famous physicist Stephen Hawking has joined Russian billionare Yuri Milner to launch a major new effort in the scientific search for extraterrestrial intelligence (SETI). They held a press conference in London to announce injecting $100 million for a new project they call Breakthrough Listen.

SETI pioneer Frank Drake is another notable figure joining Breakthrough Listen. SETI efforts rely on private funding, and this new project aims to boost the radioastronomy search activity to unprecedented levels.

"We would typically get 24 to 36 hours on a telescope per year, but now we'll have thousands of hours per year on the best instruments," UC Berkeley scientist Andrew Siemion, one of the group's cofounders, said at the news conference.

They say the project will allow scientists to collect as much data on SETI in a day as they now do in a year. The data will be made available to the public, so anyone can help in the search.

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Farmer in Chile Finds 'Chupacabra'; Science Suggests Otherwise

Benjamin Radford

A goat farmer in Chile who found two mysterious dead animals in early January concluded that he may have the remains of the Hispanic vampire beast known as *el chupacabra*. The creature, whose name is Spanish for "goat sucker," is said to suck the blood from small animals such as chickens and goats. It has never been proven to exist, though it is nearly as well known as Bigfoot and the Loch Ness monster. According to the January 22 *Daily Star*, "Goat farmer Javier Prohens was having lunch with friends when terrified farmhand 54-year-old Bricio Saldivar alerted them to the bodies of the strange creatures on the outskirts of the small town of Monte Patria in the east central Chilean province Limari." Prohens described his farmhand's reaction: "He was clearly scared and said he had been up at the old winery and found two strange bodies."The partially mummified carcasses were found amid hay bales in a cellar, and "at first we thought they might be bats, but when we looked closer, we realized they had to be something else as the heads were too big for bats. . . . And then someone said they looked like Chupacabras," Prohens was quoted as saying.

The chupacabra was first reported in August 1995 by a woman in Puerto Rico who described seeing a bizarre bipedal alien-like creature with spikes down its back. Soon it was dubbed the "chupacabra" and caused a media sensation that spread throughout the Spanish-speaking world. However, as described in my book *Tracking the Chupacabra: The Vampire Beast in Fact, Fiction, and Folklore*, it was later determined that the eyewitness had actually (and mistakenly) described a monster in the sci-fi thriller *Species*, which she had recently seen.

Though the original chupacabra report has been discredited, the stories and sightings spread through the media with the monster's description changing over time. Fewer and fewer people claimed to see the bipedal, spiky-spined monster, and by 2000 it had completely disappeared and was replaced by a variety of four-legged animals left hairless by the skin disease mange. When medical and DNA tests were done on these "chupacabras," they were revealed to be ordinary animals including dogs, coyotes, and raccoons. Last year, a couple in Ratcliffe, Texas, claimed to have found a chupacabra that turned out to be a raccoon. The word *chupacabra* is now used to describe any animal that cannot be immediately identified or otherwise looks mysterious, either because of hair loss or decomposition.

Amid all the sensational news stories about these bloodsucking monsters, there has so far been no analysis by zoologists or scientists.

So if the weird remains found in Chile are almost certainly not chupacabras, what are they? It's difficult to come to any definitive identification based upon a few photographs, though some characteristics of the creatures suggest an explanation. For one thing, they lack any spikes down the back that are characteristic of the original chupacabra. The skull, paws, and tail look feline, and the size (about a foot long) would match a common housecat. The fact that the animals were found laying one atop the other, as kittens sometimes do, may be relevant as well. A mother cat may have given birth to a litter and two of the unfortunate kittens may have been crushed to death by a bale of hay that toppled over onto them.

Where the animals were found provides another clue: inside a wine cellar. This is where domesticated animals such as cats are known to wander, hide, and even give birth—but conspicuously not a place associated with chupacabras, which are invariably reported outside, usually in desert areas (such as rural Texas) or in rainforests (such as Puerto Rico's El Yunque preserve, said to be the original home of the chupacabra). An indoor chupacabra would be a first. Furthermore, there is no suggestion by Prohens or anyone else that any goats or other animals had been found mysteriously drained of blood, as the chupacabra is known to do; in any event, the mummified mammals had been dead for many months or even years.

Amid all the sensational news stories about these bloodsucking monsters, there has so far been no analysis by zoologists or scientists. The flesh of these carcasses should be preserved enough to yield a definitive DNA sample, should Prohens or anyone else wish to submit it to a laboratory. If public curiosity prompts the remains to be tested, the results will likely come back as a known animal—just like all previous "chupacabras"—but the mystery will remain. ■

From N-Rays to EmDrives

When Does Science Become Pseudoscience?

DAVID KOEPSELL

A fair amount of pseudoscience begins as blue-sky, basic scientific hypotheses and experiments. Hypotheses can challenge basic accepted notions, or begin with them, and may yet somehow go off the rails. How does this happen, and at what point do scientific inquiries become obsessive or pathological? Consider N-rays.

Shortly after the discovery of X-rays, Prosper-René Blondlot was conducting experiments on electromagnetic radiation, specifically attempting to observe polarized X-rays, when he noticed apparent changes in the brightness of photographed sparks in an X-ray beam. Unable to account for the changed brightness according to current knowledge about X-rays, he proposed that a new form of radiation was being observed, which he called N-rays. Using "detectors" made of a dim phosphorescent material, researchers around the world began perceiving N-rays, concluding similarly that the unexpected increases in luminosity that they perceived were corroboration of the new form of radiation. Within a few years, over 300 papers were published on the subject.

When some rather notable scientists, including Lord Kelvin, failed to be able to reproduce the results, doubt about the existence of N-rays began to grow. But when Robert Wood visited Blondlot's lab and surreptitiously replaced a part of the apparatus and test materials during the course of the experiment, Blondlot noted no change in his detection of N-rays. Only then did it become clear that what was being perceived did not exist. It was the hopeful observation of a researcher who, like several hundred others around the globe, was seeing something he wanted to see. He lacked equipoise; he had become vested in a certain result.

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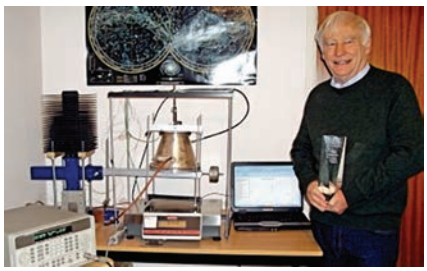
Another more recent example is the Pons and Fleischmann "cold fusion" debacle. These scientists working at the University of Utah were attempting to create "cold fusion" in a crystal lattice, an attempted shortcut to the high-energy fusion that has so far been achieved only in H-bombs and in Tokomak and inertial confinement reactors (both high-energy) to a limited degree. Having observed some rather remarkable heat and supposed neutron radiation from their setup, they rushed to tell the world. Part of their rush may have apparently been to achieve priority in getting a patent on their process, but instead of going through the usual peer-review procedure, they convened a press conference to announce they had achieved fusion at room temperature.

Their science was based on a falsifiable hypothesis. There are theoretically some conditions under which low-energy nuclear reactions could occur, but Pons and Fleischmann's experiment was not the success they had claimed. Within a few weeks, labs around the world were announcing their failures to produce anything like the temperatures that Pons and Fleischmann reported, and no neutron radiation, which would have been a necessary fingerprint of a fusion reaction. Some interesting chemistry may have been occurring, but not fusion. The negative results of other labs falsified the science, just as Wood's fiddling with the apparatus did in the N-rays case, and pursuit thereafter—at least of the Pons and Fleischmann process for cold fusion—became pseudoscientific (as indeed, people are still attempting to reproduce their result, though not with any willing, respectable funders).



Roger Shawyer, Satellite Propulsion Research Ltd

Roger Shawyer, the British scientist who invented the EmDrive

Recently there have been some rather breathless accounts of the discovery of a new form of propulsion that

appears to violate the Newtonian law of conservation of momentum. It uses no propellant and yet has been reported to produce thrust via creation of microwaves in a certain-shaped cavity. The EmDrive was first developed by British scientist Roger Shawyer. Versions have been tested by labs in China, the United States (at the Johnson Space Center, NASA), and now Germany. So far, in each of the labs conducting tests, force has been observed at varying levels in each of the slightly varying experimental setups.

So far, no one can account for the force measured, and even while all labs are measuring force while trying to eliminate experimental artifacts that might create false positives, no negative or falsifying experiments have yet shown EmDrives to be totally fruitless. Something interesting may be happening, and no doubt still more labs will attempt to replicate force, measure possible thrust, and may even try to create working prototypes—unless someone falsifies the hypothesis. This can be done by a) locating the experimental artifact that is causing measurements of force where there is no real thrust, or b) replicating the experiment and measuring no force (perhaps having eliminated somehow whatever effects may be causing false positive results).

For most modern philosophers of science, the primary means by which we consider something scientific centers around Karl Popper's notion of falsification. A hypothesis is considered to be pseudoscientific if and only if it is incapable of falsification. Any hypothesis that is logically capable of being falsified through some experiment is considered scientific. The test centers not on whether that test is presently difficult to conduct; it may even be impossible given current technology although logically possible. Thus, hypotheses about the effectiveness of prayer in healing are pseudoscientific because no experiment can be conceived of to falsify a causal link, and the best one could hope for would be some sort of statistical correlation without any hope of falsifying (or indeed confirming) causation.

If a hypothesis is capable of falsification through experiment, it is considered to be a scientific hypothesis, regardless of whether it conflicts with accepted scientific theory. This is because derived from Popper's notion of falsification is the understanding that even the most dearly embraced theories in science are also subject to potential falsification. Theory cannot become dogma, and so it too must be capable of being proved wrong through an experiment tomorrow. In fact, science at its best continually tests accepted theory, because our theories, which are models about the structure of nature, must always be considered contingent. Scientists reasonably over time become more confident in the accuracy of these models, as long as they continue to be confirmed—and more importantly not falsified—through ongoing tests.

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Our models of nature presumably improve over time through testing and through the maintenance of proper equipoise and disinterest by scientists who must be willing to accept the downfall of a theory with a falsifying test. This is the fundamental difference between science and faith, and science can become like faith when scientists are unwilling to let go of dogma in the face of evidence. While accepting new theories takes the accumulation of evidence, the falsification of a hypothesis or theory can occur with a single experiment. Weeding out pseudoscience from science thus has two major paths: asking whether a hypothesis is capable of falsification and conducting experiments that seek to falsify the hypothesis. The latter method found N-rays and cold fusion to be pseudoscience.

Has the EmDrive slipped over the line toward pseudoscience? Not yet. However, with each new experiment, the apparent thrust measured appears to be dwindling, which may be because indeed there is something going on that causes false positive measurements. There is certainly reason to remain skeptical, especially since the proposed propulsion system appears to violate a basic, well-accepted (though always contingent) physical law. Of course, many of us hope for cheaper, better, more efficient means to achieve long distance space travel. The EmDrive may lead to such technology, but it may well not; we should pursue any and all theoretically feasible means besides the EmDrive, considering it could well turn out to be just like N-rays and cold fusion. ■

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Is the EmDrive Pseudoscience?

LEONARD TRAMIEL

The question of demarcation is an interesting and important one in the philosophy of science. It is, essentially: What is science? Where do we draw the line between science and pseudoscience? I think that question is based on a false premise, namely that a sharp division exists. I don't think there is a sharp line but rather a gray area. On the other hand there are clearly some things that are pseudoscience and others that are science. So, in the cases where the distinction exists, how do we tell them apart?

David Koepsell, in the adjacent article, has given one suggestion: The pursuit of a claim moves from science to pseudoscience when the claim has been falsified. So far, so good. Clearly, if the claim is capable of being shown false and then has been demonstrated to be false, any continued pursuit is problematic at best. But does this test always work? Alas, the answer is no.

Let's take the EmDrive as an example. Looking at the most recent publication mentioned by Koepsell from the group in Germany (http://arc.aiaa.org/doi/abs/10.2514/6.2015-4083), we see in their abstract an observed thrust of about twenty micronewtons (μN). This is the force of gravity on a mass of about two milligrams, or the weight of a small mosquito. In the abstract of the paper we read: ". . . we do observe thrusts close to the actual predictions after eliminating many possible error sources that should warrant further investigation into the phenomena." Looks good, doesn't it? But take another look at that excerpt from the abstract. We'll start with the preceding sentence, which says:

> Our test campaign can not confirm or refute the claims of the EMDrive but intends to independently assess possible side-effects in the measurements methods used so far. Nevertheless, we do observe thrusts close to the actual predictions after eliminating many possible error sources that should warrant further investigation into the phenomena.

This is a classic sign of junk science: the use of obfuscation to make a statement that says one thing but is often read to say another. The statement is clear. The experiment could not confirm the claim; yet this sentence was quoted widely as confirmation! But what about the rest of that clause, "or refute"? What is that doing there? Confusing the reader, that's what. It is true that the test did detect a thrust, so why didn't that confirm the claim? Because the experiment is subject to systematic errors that are as large as the effects seen. This was, conveniently, left out of the abstract, but for the princely sum of $25 I got access to the entire paper.

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The experimental device is basically a microwave transmitter and a specially shaped cavity that is supposed to produce thrust due to resonance effects. The power levels are high enough that the components get quite warm. This left previous tests vulnerable to air currents, so a new feature of this test was added: some of it was done in a vacuum. To exclude any magnetic effects, the apparatus was isolated in a special metallic shield. The apparatus was attached to a sensitive torsion balance that can only detect horizontal deflections. They tested the force on the apparatus when the purported thrust was vertical as a control and with the thrust pointing in both positive and negative angular directions.

So what did they see? Quoting from the paper: "The control experiment (vertical-upwards direction) actually gave the biggest thrust with up to 224μN." Yes, you read that right, the control showed the largest effect. Also quoting from the paper: "We were really puzzled by this large thrust from our control experiment where we expected to measure zero." They determined that this was due to the magnetic interaction of the high currents in the experiment interacting magnetically with the magnetic shield. They removed the shield and the control direction now resulted in a detection of a force about one-tenth as large. The force measured with the

"thrust" in the positive direction was the same as the control, whereas the force for the opposite "thrust" was a bit larger and in the other direction. So there are systematic effects that are of the same size as what is considered the signal. This is clearly *not* a detection of a force from the experimental device but from the test setup. It is just magnetic effects caused by the interaction of the large currents with the metallic components of the apparatus. This is recognized by the authors as their paper ends:

> Next steps include better magnetic shielding, further vacuum tests and improved EMDrive models with higher Q factors and electronics that allow tuning for optimal operation. As a worst case we may find how to effectively shield thrust balances from magnetic fields.

So we now see that their test does not refute the claims, because they didn't want it to. It seems quite likely that they could have eliminated or characterized the magnetic effects, but they didn't.

So this is one way Koepsell's fine suggestion fails. If you allow researchers like these to obfuscate their results so that they seem to leave room for an effect, then you can escape the diagnosis of pseudoscience while firmly abandoning any claim to actual science. To me this clearly puts the EmDrive in the realm of pseudoscience.

But there is another, more problematic issue here. And by problematic I mean my position is hard to justify. As skeptics we don't hold any ideas as dogma. Everything is up for re-evaluation; all knowledge is tentative. Or is it? From a purely theoretical point of view, we can say that all ideas are vulnerable to revision, but some are so well established it seems pathological to actually consider them that way. There is a well-known class of ideas that can be immediately rejected: perpetual motion machines. These purported devices would violate either the first or second laws of thermodynamics. These laws are so well understood, and so thoroughly verified, that most people feel perfectly comfortable rejecting perpetual motion machines without any consideration.

It isn't well known outside of the physics community, but the law of momentum conservation is not just an experimentally verified assertion or even a consequence of F=ma applied to a system with no external forces. Momentum conservation is required by a truly magnificent result from mathematical physics known as Noether's Theorem. The fact that this theorem is not well known is, in my opinion, a terrible shame. The theorem is beautiful, if esoteric, and it highlights the work of one of the least appreciated contributors to our modern understanding of physics, Emmy Noether. She was a German mathematician (1882–1935) who revolutionized the areas of abstract algebra and theoretical physics; even Einstein called her a genius. Space doesn't permit an attempt (probably in vain) to convey the power of Noether's Theorem, but the law of momentum conservation is a consequence of it. If momentum is not conserved, the entire structure of physics would need to be reworked, probably in some fundamental way. To say that this is unlikely is a huge understatement. Momentum non-conservation is, to say the least, an extraordinary claim. It would require evidence so extraordinary I can't think of what it would be. Anything that seemed to violate momentum conservation would be assumed to be missing something. I submit that, at least at a practical level, a claim of momentum non-conservation is, even more than a perpetual motion machine, a *prima facie* indicator of pseudoscience. But I will relent a bit. If an experiment shows clear evidence of a violation of momentum conservation, then some effort should be made to find the error that caused it. But that isn't what happened here. We didn't have an experiment looking at something else that seemed to show that momentum was not conserved with a scientific search to find the inevitable error. Instead a device was constructed with the intention of finding that momentum was not conserved.

So, is the EmDrive pseudoscience? I think it quite clearly is. The efforts to preserve the "effect" are rife with the trappings of pseudoscience.

So, is the EmDrive pseudoscience? I think it quite clearly is. The efforts to preserve the "effect" are rife with the trappings of pseudoscience. I haven't mentioned this until now, but the mumbo-jumbo nomenclature used to describe it as an interaction with the "quark vacuum virtual plasma" (which doesn't exist) clearly places it in that category. But, as I have tried to explain, this is one of those extremely rare cases where something is worthy of the term *pseudoscience* right out of the box. ■

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Poltergeist Scribbler: The Bizarre Case of Matthew Manning

What has been called "one of the most extraordinary outbreaks of poltergeist phenomena" of the twentieth century began with an English schoolboy, aged eleven and a half years, Matthew Manning (Harrison 1994, 9).

Like many other disturbances labeled poltergeist (from *poltern* "noisy" and *geist* "spirit"), the events began with rapping sounds, objects thrown about, heavy furniture moved, objects disappearing (but sometimes reappearing in other rooms), and so on. The activities not only centered around Matthew and his home at Queen's House, Linton, Cambridge, but they followed him to boarding school. Many of today's paranormal believers suggest the phenomenon, once attributed to the devil, is caused by *psychokinetic* ("mind-over-matter") energy from pubescent children with repressed hostilities (Guiley 2000, 293–295). However, proper investigation typically shows the effects are simply due to the mischief of clever children. I have therefore termed the phenomenon the *poltergeist-faking syndrome* (Nickell 2012, 325–331; Bartholomew and Nickell 2015, 129, 136–137).

The phenomena at Queen's House that began in February 1967 soon waned but then were renewed more violently beginning at Easter 1971 and continuing through the summer. On July 31 a new phenomenon appeared and continued for a week. The effect, shown in photographs (Harrison 1994, 70–72) is remarkable.

Signatures on the Walls

Covering the walls of Matthew's bedroom—from floor to ceiling—appeared over six hundred signatures of deceased persons, most bearing dates spanning six centuries (Figure 1). By August 6, they had largely ceased, but there were occasional later additions. Among the writings were seven "poetic aphorisms" that were signed "Robert Webbe." A significant number of the dated signatures are those of Webbe family members—former tenants of the house—or others connected to it in some way, including persons who resided in the vicinity or in nearby villages. Admits Harrison (1994, 10), however, "It would be impossibly difficult and time-consuming to try to identify them all."

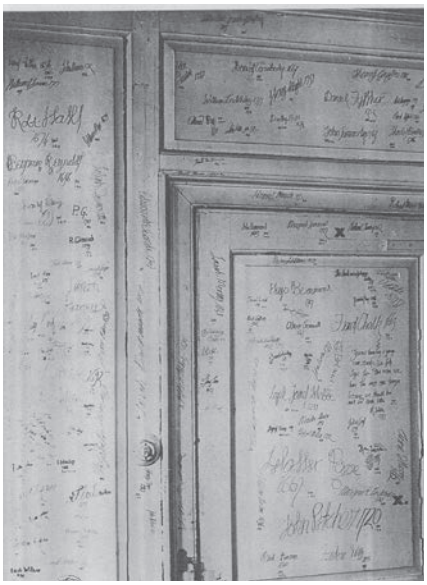

Figure 1. Matthew Manning's bedroom walls were covered with over 600 historical "signatures." (Photo by Vernon Harrison)

The writings were supposedly produced by "discarnate entities" using pencils that were left lying on a table. These writings were never seen being done—unlike Matthew's later automatic writings and drawings (to be discussed presently) that were frequently observed as he produced them (Beloff 1994, 5). In my experience, a spiritualistic phenomenon that appears shy about being witnessed is most likely faked. And the idea that a ghost—which necessarily lacks a brain—could grip a pencil, let alone engage in writing, is ludicrous.

Dr. Vernon Harrison—described as a handwriting expert and professional photographer—took photos of the wall writings before they were painted over, and then studied them. Although he found problems here and there, he convinced himself that the writings "were examples of direct writing by some entity or entities," but he was careful to add, "I do not insist on it" (Harrison 1994, 39). John Beloff of the Society for Psychical Research (which published Harrison's lengthy report) thought the behavior that deliberate hoaxing would have required "is so bizarre that the case would at least force us to question our assumptions regarding the limits of human perversity" (1994, 5–6).

Matthew would have been the obvious, and perhaps only, suspect for hoaxing. Since the signatures that covered the bedroom walls like graffiti came as

part of a "poltergeist" outbreak, the prankster may have been looking for attention. In fact, we learn:

> Matthew had been working on local history as part of a school project, so some of the names must have been familiar to him. "Webbe" said that he had noticed his good work and decided to help him by providing him with "half a thousand" names of his "friends, allies and family." (Harrison 1994, 10)

Handwriting Examination

I was determined to make my own examination of the photographed wall writings. (I have had training in forensic writing examination [Handwriting 2008], authored textbooks in the field [Nickell 1990; 1996; 1999; 2009], and worked on many famous cases. These include the alleged diary of Jack the Ripper, the manuscript of *The Bondwoman's Narrative*, the purported original of Lincoln's Gettysburg Address, and the identification card of Nazi war criminal John Demjanjuk.) I studied the wall writings at length.

Unfortunately, the "spirit" scripts have the characteristics of having been *slowly drawn* rather than *naturally written*. They exhibit unnatural evenness in pressure, reveal tremor from hesitancy, show occasional kinked lines betraying uncertainty of movement, and demonstrate blunt beginning and ending strokes. (See Nickell 1996, 65–72.) These are traits associated with imitative writings, such as forgeries, yet these are not the most serious faults.

Most of the "signatures" cannot really be called that because—as in the case of "Robert Webbe"—there are no known examples of either signature or handwriting for comparison (Harrison 1994, 11). The same is true of most of the other writings. Thus, if Matthew Manning, say, were secretly making them, he would not have to reproduce an actual signature, but merely write in a variety of amateurishly created styles—rather like a mimic speaking different made-up voices.

A signature purporting to be that of a well-known historical figure, "Oliver Cromwell 1643" (Harrison 1994, 76), not only fails to have any resemblance to genuine signatures of Cromwell (cf. Rawlins 1978, 24, 25, 55), but it even has some wrong (non-Cromwellian) letter forms. Moreover, it is in the same hand as that of some of the other bogus scripts—mostly variations of the hand of "Robert Webbe," as Harrison admits (1994, 16, 19), some of them "ornamented."

Then there is the evidence that the individual who actually wrote the scripts failed to understand the handwriting of the periods in question. Thus, even though he offers writings dated in the sixteenth century for example, he shows no knowledge of the common English Secretary Hand that evolved in the late fifteenth century and continued well into the seventeenth (Nickell 1990, 122–124, 202–203). Apart from the handwriting per se, there are anachronisms, such as "Robert Webbe's" use of *ye* (for the article *the*) that had become effectively obsolete long before Webbe's death in 1736. Harrison (1994, 11) admits the use may have been intended to give, spuriously, a *ye olde antique* air to the writing, and I am convinced that that is so. Another example is a copy of an excerpt from the Anglo-Saxon Chronicle manuscript. The copyist did not even understand the letter forms, let alone comprehend what the text said. (See Harrison 1994, 26, 86.)

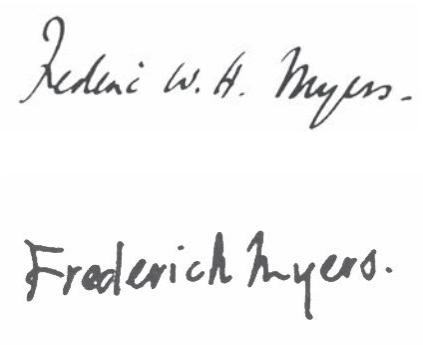

Figure 2. Genuine signature of psychical researcher Frederic W.H. Myers (top) is shown with Matthew Manning's automatically written one, which is obviously bogus.

Automatic Writings

Soon, Matthew Manning had discovered that he could produce "automatic" writing. In this activity, spirits allegedly guide the hand of the "entranced" medium to produce writings, drawings, or other expressions. If not deliberately faked, such activities are attributed to persons producing the effects while in a dissociative state. (Dissociation is the unconscious process in which a group of mental activities are separated from the main stream of consciousness and so function as a separate unit.) (Nickell 2012, 204–205, 347; Mühl 1963)

As with the "signatures," there are serious problems with the "automatic" writings of Manning. In the case of a message purportedly from psychical researcher Frederic W. H. Myers (1843–1901), not only does the script bear no resemblance to Myers's handwriting, even lacking his nineteenth-century features (like the lower-case "p" with tall ascender), but the "F" of the signature is even the wrong form (printed rather than cursive). Indeed, all of the "Myers" text is very similar to the print-writing of Manning himself. Moreover (trumping the rationalization that Manning's hand was asserting itself while being guided), what should have been "Frederic W. H. Myers" is actually rendered as "Frederick Myers." (Figure 2; see Harrison 1994, 33–34, 91–93.)

There are similar problems with other writings. Bertrand Russell, the atheist philosopher, supposedly writes in acknowledgment that, indeed, one does not die at death. Spiritualists such as Manning are always trying to posthumously convert nonbelievers, but this shrewd attempt fails because, once again, the writing is spurious: for example, the signature includes the wrong forms of the letters *B* and *r*. (See Harrison 1994, 89; cf. Rawlins 1978, 198.)

Again, the writing of "Millicent Webbe" is bogus. Although there is no known specimen for comparison, it has a welter of internal inconsistencies, such as multiple variants of pseudo-antique forms. Also, it is signed once with its three letters *e* in Roman form,

and again with one Roman and two Greek forms (Harrison 1994, 28, 87).

Automatic Drawings

In producing both automatic writings and drawings, Matthew Manning follows in the footsteps of others with multiple automatism skills, notably Rosemary Brown. She first claimed to receive dictations of writing from spirits of the dead (such as Albert Einstein, Carl Jung, and George Bernard Shaw), then, prompted by an injury to pass time at her piano, began to receive compositions from noted composers such as Bach, Chopin, Mozart, and Rachmaninoff. Brown gave more than 400 public performances of her "channeled" music. While some saw her as indeed exhibiting the various composers' styles, others more critical regarded her as only a mimic (Guiley 2000, 27).

Manning's automatic drawings appeared to be works by Aubrey Beardsley, Paul Klee, Henri Matisse, and Pablo Picasso—among others.

Manning's automatic drawings appeared to be works by Aubrey Beardsley, Paul Klee, Henri Matisse, and Pablo Picasso—among others. Purportedly, the spirits of the great artists would visit Manning while he was in a trance. He told the *San Francisco Examiner* that an expert from Sotheby's in London had said a "Picasso" he had done looked so much like an original that Sotheby's would have authenticated it had they not been informed it was a "Manning." However, noted psychical investigator James Randi wrote to Sotheby's, receiving the reply that the claim was "absolutely not true." The official stated that the drawings allegedly done by "spirits of various artists" were all produced by a single hand, and while clever, were obviously forgeries of known works (Gordon 1987, 101).

Consider one example of alleged Manning automatism that Harrison (1994, 43) terms "the *pièce de résistance*." It is ostensibly a decorative pen-and-ink work by master Art Nouveau illustrator Beardsley (1872–1898), although "received" through Matthew Manning. In fact, the drawing is a composite of two forgeries of Beardsley from a published book of the artist's works! (Harrison 1994, 44). But even this evidence does not dissuade the credulous Harrison.

Overall Assessment

Matthew Manning began as the focus of "poltergeist" activity that morphed into the phenomenon of spirit inscriptions appearing all over his bedroom walls that in turn led to his becoming an automatic writer and drawer. He has also claimed to be a psychokinetic metal bender—though his efforts cannot be distinguished from magic tricks (Booth 1986, 57). And he has claimed to apport objects (i.e., cause them to magically appear), communicate telepathically, astrally project himself into the past, and predict the future (Guiley 2000, 27). By the 1990s, he was also calling himself a healer (Harrison 1994, 8). In fact, he has many of the traits associated with a fantasy-prone personality (Nickell 2012, 347–348).

Manning's purported psychic abilities were tested in 1972 for a proposed BBC broadcast. Researchers asked him to provide information—using automatic writing—about a set of small objects as well as information about the authors of some letters (each in a sealed envelope). The information Manning provided was essentially erroneous, and the planned broadcast was canceled. Later it was observed that all but one of the eight extant automatic messages had been written "clearly in variations of one hand" (that of "Robert Webbe"). The other began in an obviously disguised hand that slowly evolved into a semblance of the others, revealing that the writer was unable to keep up the disguise (Harrison 1994, 24–25).

Manning was also tested by physicist John Taylor (1980, 83) and colleague Eduardo Balanovski as to his abilities in remote viewing (the alleged power of seeing things at a distance by clairvoyance or out-of-body travel). The researchers judged the results to be "completely unsuccessful."

In brief, the evidence does not show Matthew Manning—self-proclaimed wonderworker and jack-of-all-trades occultist—to have the paranormal powers he professes. But he keeps trying to convince us otherwise. ■

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NOTES ON A STRANGE WORLD] MASSIMO POLIDORO

Massimo Polidoro is an investigator of the paranormal, lecturer, and cofounder and head of CICAP, the Italian skeptics group. His website is at www.massimopolidoro.com.

The Charlie Charlie Challenge

"Charlie, can we play?"

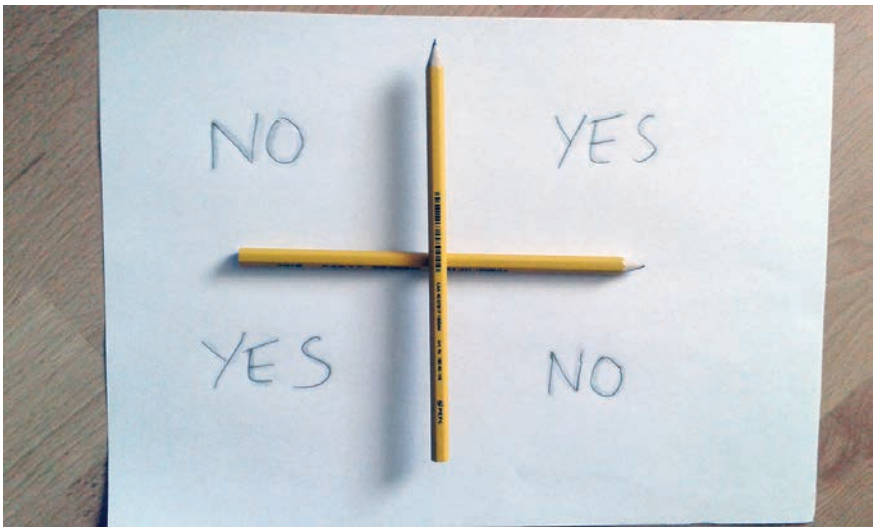
This simple question—and two pencils put on a cross drawn on a piece of paper—should allow you to evoke the spirit of a child or even a demon.

This is the latest web craze known as the "Charlie Charlie Challenge," perhaps dating back to an ancient Mexican tradition, an experience that intrigues kids and scares adults. Through a sort of séance, some claim people can ask questions to some unseen entity that should be able to reply.

It works like this: On a sheet of paper you draw a cross and in the four quadrants thus formed you write the words Yes and No. You then put a pencil on the sheet, corresponding to one arm of the cross, and a second pencil you put perpendicularly onto the first. Then you ask if the spirit is present, and when the top pencil moves on Yes, you can start asking questions. If it moves to No, just try again later.

On social media, you can find videos of people fleeing in terror as soon as the pencil starts moving, or kids who burst out laughing when the question "Will I be rejected?" has the pencil moving to No.

There are those who take this game quite seriously. In Jamaica, the Ministry of Education has issued a ban against students playing the game, as has the Fiji Ministry of Education. In Italy, the head teacher of a middle school in Ceres, in the province of Verona, has forbidden the game in class to avoid upsetting sensitive students. There are even those who worry that the game could unleash real supernatural phenomena.



The idea of a power allowing people to summon spirits extemporaneously—and without the intervention of a medium who needs to fall into a trance—is anything but new.

The Catholic writer Annalisa Colzi is convinced: "Well, the play Charlie has this purpose: to enslave the souls through the evocation of demons," she explains on her blog. "What happens to those who play this game? Many unpleasant surprises that get worse over time." And the president of the GRIS (Group of Socio-Religious Research and Information), Father François Dermine, an exorcist, agrees: "I know a lady who after dabbling in spiritualism began to hear voices who told her to kill and many other negative things that made her head explode. She started a series of exorcism sessions, but it was not easy to free her; it took years of pain and insomnia." These rumors and fears of negative consequences have no confirmation in reality beyond individual psychological problems.

The idea of a power allowing people to summon spirits extemporaneously—and without the intervention of a medium who needs to fall into a trance—is anything but new. During the late 1800s, the Ouija board was all the rage.

It was a rectangular wood plate on which the letters of the alphabet were drawn, plus the words *Yes* and *No*. Its name derived from the word "Yes" in French and German.

An indicator or planchette was placed on the board, and on it the participants placed a finger. After a while, the indicator started to move, moving to several letters that formed, in sequence, words in response to questions put to the spirit. A more recent version of the Ouija sees the use of a board of paper on which the alphabet letters are handwritten and, instead of the indicator, an upturned glass or a coin are used. Participants rest a finger on the back of the glass and it starts moving, indicating different letters. The Ouija board was later patented as a board game by Parker Brothers and can be easily be found in toy stores.

The explanation for such phenomena has been well known since the nineteenth century when physicist Michael Faraday, studying the phenomenon of moving tables during séances, discovered that it was not the spirits that moved them but the people who were sitting around it resting their fingers on the table surface. They did not do so voluntarily, of course, but by involuntary muscular movements.

In such cases, participants form words in response to the questions asked, pushing the indicator without noticing. However, should they lift their fingers from the indicator, the "spirits" suddenly stop communicating. In other words, when the mind is absorbed in concentration, the muscles obey the will of the operator without him or her noticing. This reaction is now known as the ideomotor effect.

This mechanism, however, does not explain the Charlie Charlie Challenge, since nobody here touches the pencils. What happens, and how did this phenomenon start? First, it should be noted that it does not have ancient Mexican origins but is something much more recent. Some have speculated it may be a viral marketing gimmick designed to promote a horror movie just coming out at the time, *The Gallows*, but even if the film's producers had tried to take advantage of such free advertising, the game did not originate with them.

When the mind is absorbed in concentration, the muscles obey the will of the operator without him or her noticing. This reaction is now known as the ideomotor effect.

The origin seems rather a balancing act with pencils called "Jugando Charly Charlie" posted on YouTube in 2014, or a variation of a few years back. However, it seems that it was a sensational television report aired last April on television in the Dominican Republic that triggered a worldwide interest in the game.

For Caitlyn Dewey of the *Washington Post*, the game is the perfect example of a viral fad crossing cultures: "Charlie makes a killer case study in virality and how things move in and out of languages and cultures online. You'll notice, for instance, a lot of players and reporters talking about the game as if it were new, when it's actually—and more interestingly, I think—an old game that has just recently crossed the language divide."

But can two pencils really unleash supernatural forces? Of course not. The movement is due to the unstable equilibrium in the two pencils. Indeed, it is almost impossible to keep the top pencil still once it is set above the other one. Any air current, caused by a movement, a breeze, or even only by breath, is enough to trigger the rotation. Just try it.

But a question remains: Are these seemingly supernatural games bad for our kids? "There's a real social bonding aspect to this whole phenomenon," says Stuart Vyse, a psychologist at Connecticut College, was quoted as saying on the website Vox. "It's almost a developmental passage for some kids, to deal with things that are scary."

However, there are no scientific studies yet about what effects playing games like the Charlie Charlie Challenge may have on the psyche or behavior of kids. Says Mark Griffiths, a psychologist at Nottingham Trent University in England, in an article for *The Independent*:

> As both a psychologist and a father of three adolescents, I have yet to see any evidence that the playing of such games does any psychological harm although it's not an activity that I would actively encourage either. As a teenager and as a university student I playfully engaged in séances and at one party used a Ouija board and it never did me any harm. Some may even argue that such activities are "character building." However, there may be children and adolescents of a more sensitive disposition where such games might have a more long-lasting negative detrimental effect. ■

Sheaffer's "Psychic Vibrations" column has appeared in the SKEPTICAL INQUIRER for nearly forty years; its highlights have now been published as a book (Create Space, 2011). Sheaffer blogs at www.BadUFOs.com, and his website is www.debunker.com.

The Rendle-Sham Case: Phony and Phonier

The Rendlesham Forest UFO landing case (sometimes referred to as "the British Roswell") involved the supposed landing (or at least "close encounter"; the story is inconsistent) of a UFO in Rendlesham Forest, Sussex, United Kingdom, in December 1980. Just like the story of the fish that got away, it gets bigger with each telling: the more time that passes the more exciting the Rendlesham case becomes. In what has almost become an annual ritual, one of the supposed witnesses invents a new and dramatic claim to "prove" that the case is real.

British skeptic Ian Ridpath has long stayed on top of this case (his work can be found at http://goo.gl/mNZOcc). Here is his summary of it:

> Although the overall case is complex, the main aspects can be summarized as follows:
>
> 1. Security guards saw bright lights apparently descending into Rendlesham Forest around 3 a.m. on December 26, 1980. A bright fireball burned up over southern England at the same time.
> 2. The guards went out into the forest and saw a flashing light between the trees, which they followed until they realized it was coming from a lighthouse (at Orford Ness).
> 3. After daybreak, indentations in the ground and marks on the trees were found in a clearing. Local police and a forester identified these as rabbit scrapings and cuts made by foresters.
> 4. Two nights later the deputy base commander, Lt. Col. Charles Halt, investigated the area. He took radiation readings, which revealed only background levels.

> He also saw a flashing light in the direction of Orford Ness but was unable to identify it.
> 5. Col. Halt reported seeing star-like objects that twinkled and hovered for hours. The brightest of these, which at times appeared to send down beams of light, was in the direction of Sirius, the brightest star in the sky.
>
> At its most basic, the case comes down to the misinterpretation of a series of nocturnal lights—a fireball, a lighthouse, and some stars. Such misidentifications are, of course, standard fare for UFOlogy; it is only the concatenation of three different stimuli that makes this case exceptional.

The BBC reported on July 13 (at http://goo.gl/fnMWnL) that Col. Halt is now claiming:

> "I have confirmation that (Bentwaters radar operators) . . . saw the object go across their 60 mile (96km) scope in two or three seconds, thousands of miles an hour, he came back across their scope again, stopped near the water tower, they watched it and observed it go into the forest where we were," said Col Halt.
>
> "At Wattisham, they picked up what they called a 'bogie' and lost it near Rendlesham Forest."
>
> "Whatever was there was clearly under intelligent control."

In what has almost become an annual ritual, one of the supposed witnesses invents a new and dramatic claim to "prove" that the case is real.

Halt does not name the supposed radar operators, nor does he say how he obtained this information. He claimed that the operators said nothing about this until after their retirement, for fear of being "decertified" for reporting a UFO. Even if this unlikely claim were true, it does not correspond to what the supposed witnesses are reporting: a UFO allegedly whizzing by at thousands of miles an hour does not match the UFO(s) allegedly seen hovering for hours above the forest and even landing there.

Lee Speigel wrote in the *Huffington Post* on July 21 that Halt says this new information will "blow the lid off" the Rendlesham Forest sightings:

> We previously reported how Halt accused the U.S. government of covering up UFO information, and he believes there's a top secret agency that's in charge of anything to do with possible extraterrestrial visits to Earth. "There is a contract civilian agency, that is fed information, that is controlling everything. It's made up of either former military, high-level government agencies or high-ranking, very knowledgeable scientists. I can almost guarantee you. That's the way we do it. And disinformation is the biggest thing," Halt told HuffPost on Friday.

The *Daily Express* of London reported on July 14 that Halt said:

- Rendlesham Forest was mobbed with US military personnel "hunting UFOs" at the time.
- A "UFO exploded" before his eyes and another "shot down a laser beam" from 3,000 feet above.
- The UK Ministry of Defence later hid documents relating to Rendlesham.
- US personnel who "lost 40 minutes" during the sighting have been denied access to medical files.

> Speaking at a UFO conference in Woodbridge, Suffolk, he said: "There is no doubt in my mind we are not alone and there are some people (in power) who know this, but even Mr. (Barack) Obama won't get through to them."

This is not the first time that Halt has "jazzed up" his account of the Rendlesham incidents. Ridpath describes Halt's "iffy affidavit," written in 2010, as a "disastrous attempt to rewrite the facts of the case," suggesting that "this product of his 30-year-old memory differs so substantively from what he said and wrote at the time that it would be destroyed in a court of law" (at http://goo.gl/Yyg6KG).

What are other "top witnesses" from Rendlesham reporting?

Airman Larry Warren claimed to have seen a light in the forest that "blew up," then re-assembled itself, and alien beings came scampering out of it. He says they resembled "children in snowsuits" (https://goo.gl/Swf8cy). By his account, many other Air Force personnel saw these creatures, but nobody else has reported them.

Another supposed witness, John Burroughs, has implied while supposedly under hypnosis that he and Sgt. Penniston were abducted by beings onto the UFO for about forty minutes and brought back to a different place (https://goo.gl/sxh8V2). Supposedly base personnel saw them being lifted up to the object and worried that they would never be returned. Currently Burroughs is charging that his inability to obtain medical care from the Veterans Administration is tied in with his alleged UFO encounter and that his medical records are "classified." Others see him as just one among thousands of victims of the ongoing Veterans Administration scandal in which veterans have been denied medical care.

This is not the first time that Halt has "jazzed up" his account of the Rendlesham incidents.

Sgt. Jim Penniston (ret.), however, relates a completely different UFO yarn, in spite of supposedly sharing in Burrough's UFO abduction. He claims to have spent the forty minutes examining and touching a landed UFO and to have received a telepathic message from it in the form of a "binary code," which he wrote down in real-time. However, he did not tell anyone about this for over twenty years. Ridpath points out that Penniston wrote down the wrong date and time for the event in his notebook (http://goo.gl/IgkM2W).

Penniston now says that the binary data from the Rendlesham UFO was sent by time travelers, which makes sense since aliens would hardly be expected to encode their messages using ASCII, the American Standard Code for Information Interchange. But time travelers from a future Earth might possibly still be using ASCII 6,000 years from now (and probably Microsoft Windows as well). When Penniston was interviewed on a 2011 podcast by Angela Joiner, his story got all tangled up under her questioning. Penniston got confused whether he knew what the code meant as it was being transmitted (https://goo.gl/8y8bhE). He finally decided that he knew what six pages of it meant, but he thought the rest of it "didn't mean nothin'."

What does Penniston's supposed "binary code" supposedly mean? The well-known British UFOlogist Nick Pope writes:

> Many people have attempted to translate the Rendlesham Code. The best-known suggestion so far is "Exploration of humanity. Continuous for planetary advance. Eyes of your eyes. Origin year 8100." Also included is a list of geographical co-ordinates which seem to match up with a number of mysterious and ancient sites such as the Great Pyramid in Egypt and the Nazca Lines in Peru. Another co-ordinate corresponds with the fabled location of the "lost continent" of Hy-Brasil, a supposed sunken island in the Atlantic, off the West coast of Ireland, sometimes dubbed the "Celtic Atlantis" (http://goo.gl/jC2Zx7).

So it's supposedly a binary message from the Celtic Atlantis in the year 8100. Sounds plausible. If you can describe any of these "witnesses" as "credible," then you are much better at "believing things" than me. Finally, the Rendlesham Forest now has its own official "UFO Trail," with a map and an explanation helpfully posted on a sign.

A UFO encounter is a terrible thing to waste. ■

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of seven books, including *Mysterious New Mexico: Miracles, Magic, and Monsters in the Land of Enchantment*.

Beware Mesmer Thieves!

Q: **Can thieves really use hypnosis to rob people? There's a strange news story from England in which that's claimed to have happened.**

—Paul Harris

A: I examined the bizarre case Harris referred to and began by consulting several news sources (Dubuis and Freeman 2014, Telegraph Video 2014, etc.). An article in the *London Evening Standard* summarized the circumstances:

> A "hypnotist thief" apparently put the owner of an upmarket off-licence in a trance before rifling through his trouser pockets and stealing the day's takings. Friends today said Aftab Haider, 56, the owner of independent wine merchants Hops and Pops in Highgate, north London, was "stunned" by the theft of hundreds of pounds in cash. The raid mirrors techniques used as entertainment by street magicians and is the first time its use in crime has been captured on CCTV in the UK. The suspect, an Eastern European man wearing a black bomber jacket, brushed past Mr. Haider as he placed a bottle on a shelf, and gently tapped him on the arm. A few seconds later, the suspect made a stabbing gesture with his right hand at eye-level which appeared to leave Mr. Haider, known as Aziz, mesmerised. He reached inside the motionless shop owner's trouser pocket, and pulled out his wallet before briefly squeezing his shoulder. The thief, who kept up a quietly-spoken patter throughout, then mimed the gesture of a pregnant woman's belly as Mr. Haider turned to face him. He reached into his other pocket and pulled out the day's takings, hundreds of pounds in a bundle of notes, before tapping him once more on the shoulder and quickly walking out. Mr. Haider snapped out of the trance a few seconds later. (Dubuis and Freeman 2014)

The event happened around 9:45 on the evening of September 11, 2014, nearly three months before the story was reported (reasons for the delay are not clear but may have been the result of police trying to restart a stalled investigation by releasing the security camera footage and asking the public for assistance in identifying the thief). Detective Sergeant Dave Bullock was quoted in the news story: "The victim remained motionless and unable to stop the robbery taking place. He said that he was momentarily unaware of what had happened to him. The suspect's distraction tactics appeared to have worked as he robbed the victim of cash from his pocket."

A Closer Look

The news story was widely taken at face value at the time and shared as a "weird news" item in news outlets and on social media. However, a closer look at the reported circumstances of the theft raises skeptical questions. For example, how could the thief know that Mr. Haider had the day's receipts in his pocket at that time? The money could have been anywhere in the business, from a safe to a cash register, yet the robber seemed to know exactly where the money was and when. Furthermore, the video does not, in fact, reveal the shopkeeper being "mesmerized."

Though many news stories stated that as an obvious and established truth, there is of course no way to confirm that aside from Haider's own claim—which may or may not be accurate even assuming that is his sincere belief.

In trying to address the implausibility of a single-event hypnosis, some claimed that the thief must have previously pre-hypnotized Haider in preparation for such a bold and bizarre robbery. Magician Damien O'Brien, who has appeared on the BBC, speculated in the *Evening Standard* that Haider may have been previously hypnotized by the suspected thief who unconsciously implanted "trigger words" that would allow a quick hypnosis on a later visit: "He may have said on an earlier visit that the next time he comes in and touches the man on the shoulder he is going to go into a relaxed trance and will let him go into his pockets. The shoulder touch could be a trigger."

Yet why would the hypnosis thief tap his victim on the shoulder, apparently bringing him to his senses, just before leaving? If you have someone doing your will and under your power, why would you release them from that power before—not after—trying to escape? Any thief who wanted to assure a clean getaway would simply leave the shopkeeper mesmerized; to not do so is like a bank robber pausing to untie his or her bound victims before leaving the bank so they can promptly summon police.

And why would a thief risk going into the same place twice? Sometimes thieves may make a trial run to "case the joint" and establish entrances, exits, security measures of an intended robbery, and so on—but that's apparently not what happened here since the route in and out is very short and clear, and there was seemingly no effort to evade security cameras. There's also the unasked question of why, if the thief had previously hypnotized Haider, he wouldn't remember the encounter. This element of the story echoes popular culture assumptions of hypnosis but not the psychological research. There is no clinical evidence whatsoever that a hypnotist can make a person simply forget an experience they had—in fact the effect is usually exactly the opposite; a careless hypnotist can easily create false memories of things that never happened.

There has been no follow up arrests or additional information on this strange case since it made the news, and at this remove it's impossible to know what exactly happened in that London shop. However, a hypnotist thief is the least likely explanation. It's more likely that Haider was simply confused or stunned for a few moments during the robbery (when startling things—such as a robbery—happen people sometimes simply and involuntarily "freeze up" in an indecisive fight-or-flight moment; this might account for the statement that he was "momentarily unaware" of his surroundings). In fact, the thief's actions look very much like those of an accomplished pickpocket using distraction and misdirection, and the sensational hypnotism claim may simply be a post-hoc rationalization by Haider for his inaction. It's also possible that the robbery was staged; faked workplace robberies and thefts are not unknown and allow employees to account for missing money.

There is no clinical evidence whatsoever that a hypnotist can make a person simply forget an experience they had—in fact the effect is usually exactly the opposite; a careless hypnotist can easily create false memories of things that never happened.

Other Hypnosis Thefts

This is not the first time that people have reported being robbed by hypnotists. In 2014 a German woman claimed she was hypnotized (by psychics, no less) outside of a supermarket, put into a trance, and later woke up at home having been robbed:

> A pair of hypnotists are being hunted by police after a victim claimed she was put in a trance before being robbed. Police in Germany are investigating a spate of crimes involving two Russian women who tell their victims they will read their fortune. In one incident 66 year-old Sarah Alexeyeva told detectives she was spoken to outside an Aldi supermarket in Elmshorn, Schleswig-Holstein. But the next thing she knew she snapped out of a trance and was sat in her armchair at home. All her jewellery and valuables had disappeared, police said. (Bradley 2014)

According to a 2008 BBC News story, "Police in Italy have issued footage of a man who is suspected of hypnotizing supermarket checkout staff to hand over money from their cash registers. In every case, the

last thing staff reportedly remembered was the thief leaning over and saying: 'Look into my eyes,' before finding the till empty" ('Hypnotist' Thief 2008).

There's a certain creepy gothic fear to the idea that a mesmerizing stranger can ask you to stare deeply into his eyes, or ask you to follow a pocket watch swaying seductively to and fro, and listen to him count backwards into a hypnotic trance. But it's pure fiction. Hypnosis is a widely misunderstood psychological phenomenon, due largely to its depictions in popular culture and film. One common myth about hypnosis is that it can put someone into a helpless or suggestible trancelike state. If it were possible to simply stare deeply into a stranger's eyes to induce a trancelike, compliant state, then it would happen all the time. Anyone with practice or skill in hypnosis could easily turn to a life of crime by walking into a bank, casting a hypnotic stare at a teller, and take whatever they like. In their book *50 Great Myths of Popular Psychology*, psychologists Scott Lilienfeld, Steven Jay Lynn, John Ruscio, and Barry Beyerstein debunk this popular myth:

> Recent survey data show that public opinion resonates with media portrayals of hypnosis. Specifically, 77% of college students endorsed the statement that "hypnosis is an altered state of consciousness, quite different from normal waking consciousness."... But research refutes these widely accepted beliefs. Hypnotized people are by no means mindless automatons. (Lilienfeld et al. 2010)

Hypnosis is not some special altered state of consciousness but simply a form of deep relaxation. Stage hypnosis—such as the kind seen in Las Vegas comedy acts where "suggestible" audience members get onstage and pretend to be chickens or caught in embarrassing situations—is not true clinical hypnosis but instead a combination of showmanship, exhibitionism, and participatory comedy. It's not clear why a person would believe or assume that he or she had been put into a hypnotic trance when they had not. Such a belief may be due to memory loss or confusion, but there's no reason to fear hypnotist bandits. ■

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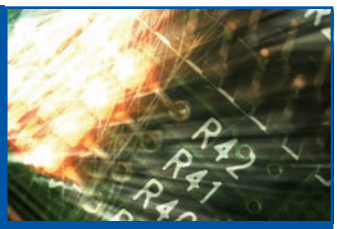

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THE
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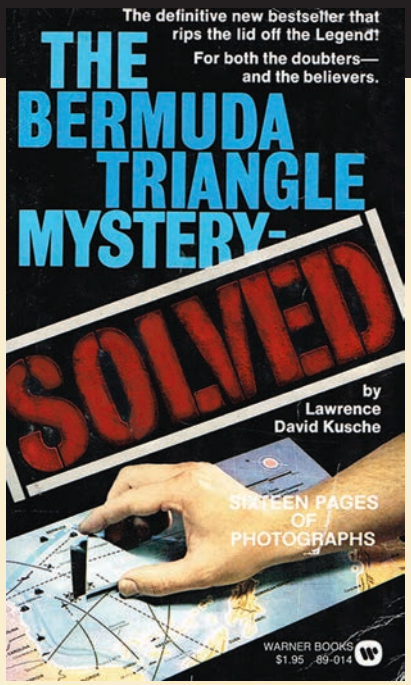
TRIANGLE MYSTERY DELUSION

Looking Back after Forty Years

The man who solved the Bermuda Triangle "mystery" looks back after four decades on his investigations into the missing flight that started it all and the shoddy research, gullibility, and distortions that created this mystery.

LARRY KUSCHE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Forty years have passed since my book *The Bermuda Triangle Mystery—Solved* was published in 1975. The most important chapter is "Flight 19," the account of the five Navy Avenger torpedo bombers and a Martin Mariner PBM that disappeared on December 5, 1945. Flight 19 was on an overwater navigation-training flight from Fort Lauderdale, Florida, to the Bahamas and back. The Mariner was searching for the Avengers after they got lost.

The disappearance of Flight 19 is the most famous, dramatic, complicated, and relevant incident in the part of the Atlantic Ocean off the southeastern coast of the United States that, twenty years later, would become known as the mysterious Bermuda Triangle. The original mystery story of Flight 19, as it was told for decades by those who did little or no research in authoritative sources, when compared to the true and accurate account—based on my research that included the official Navy report of the disaster, the personal records of flight leader Charles C. Taylor, the ninety-two personal interviews that I conducted, and my flight of the route—is a microcosm of how the mystery/delusion of the entire Bermuda Triangle story came about, and how I came to realize that the Bermuda Triangle is one of the biggest frauds/delusions that has ever been perpetrated.

Flight 19 is such a significant part of the Triangle story that, if the planes had safely returned to base, the concept of the Bermuda Triangle would never have been created. We would never have heard of the Bermuda Triangle, and all the articles, books, documentaries, movies, and websites about it would never have been created.

Figure 1. A Navy Avenger torpedo bomber. The pilot is Willard Stoll, one of the last men to talk with instructor-pilot Lt. Charles C. Taylor before Taylor left on ill-fated Flight 19 on December 5, 1945. Author Larry Kusche interviewed Stoll in his Michigan home. Stoll, the leader of Flight 18, heard Taylor on the radio when he was in the northern Bahamas. He told Kusche that Taylor "couldn't have been too far away at the time."

The loss of the Avengers (Figure 1) and the search plane was a legitimate, confusing, national front-page mystery at the time it occurred. Years later, magazines and newspapers began to publicize it and other supposed mysteries in the area. UFOs were a new, popular, and exciting topic in the 1950s. Best-selling books such as *Flying Saucers on the Attack*, *The Case for the UFO*, *The Flying Saucer Conspiracy*, *Strange Mysteries of Time and Space*, *Stranger Than Science*, and others speculated that Flight 19 had been captured by aliens from outer space.

Early in the popular 1977 Spielberg movie *Close Encounters of the Third Kind*, the Avengers suddenly appeared in the Mojave Desert. Near the end, the aviators, who had not aged, walked out of a huge UFO.

The part of the Atlantic Ocean where Flight 19 disappeared became popular when it was given a clever, catchy name by Vincent H. Gaddis in his February 1964 article "The Deadly Bermuda Triangle" in *Argosy*, a popular men's pulp adventure and modest girlie magazine. A shortened version appeared in the July/August 1964 *Flying Saucer Review*.

The *Argosy* article, with several additions, then became Chapter 13, "The Triangle of Death," in Gaddis's 1965 book *Invisible Horizons; True Mysteries of the Sea*. In what is a rarity among those who would later add to "the mystery," Gaddis listed the sources of information he used in the book:

Various newspaper articles.

The Books of Charles Fort.

Sea's Puzzles Still Baffle Men in Pushbutton Age. E.V.W. Jones, Associated Press, Sept. 16, 1950, was the first to mention the region as a place of mysterious disappearances.

Sea Mystery at Our Back Door, George X. Sand, *Fate Magazine*, Oct. 1952, expanded on the Jones article.

The 1950s UFO bestsellers previously listed.

The Mystery of the Lost Patrol, Allan W. Eckert, *American Legion Magazine*, April 1962, which included fictionalized, dramatized messages that would be attributed to Flight 19 by many of the later mysteryans.

[*Mysteryans* is my shortcut word for those who contributed to the creation of the mystery.]

Gaddis wrote:

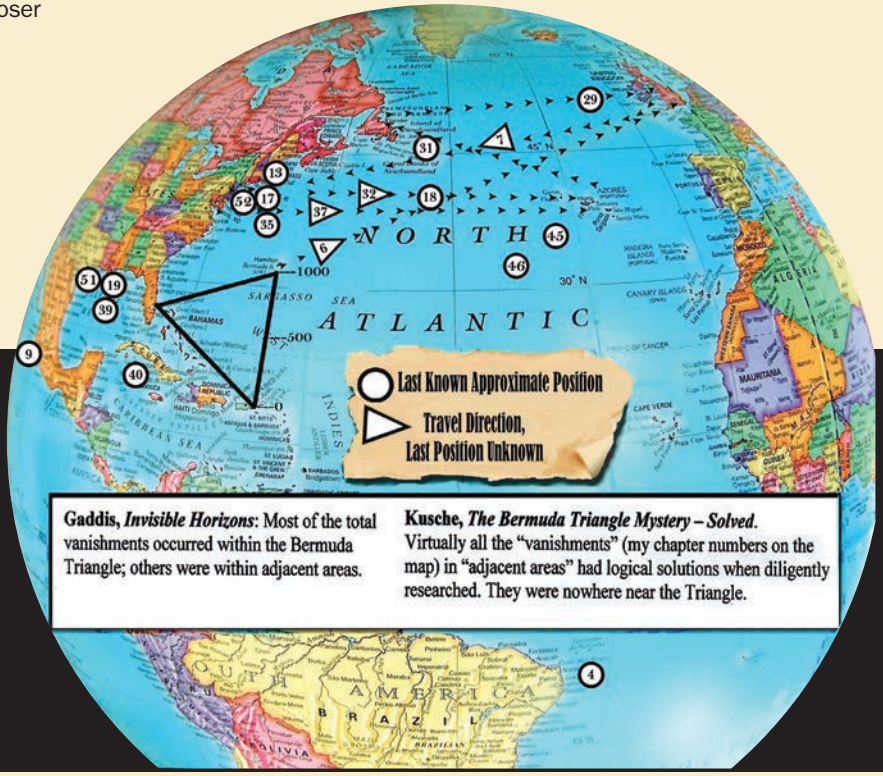
> Draw a line from Florida to Bermuda, another from Bermuda to Puerto Rico, and a third line back to Florida through the Bahamas. Within this roughly triangular area, known as the "Bermuda Triangle," most of the total vanishments have occurred. Others have happened in adjacent areas to the north and east in the Atlantic, south in the Caribbean, and west in the Gulf of Mexico.

Gaddis did not define how far the "adjacent areas" extended, while adding, "This relatively limited area is the scene of disappearances that total far beyond the laws of chance." He gave no information as to what were the laws of chance, but it sounded scientific, as if the matter had been thoroughly studied. Map 1 (based on my research) shows the intended routes or known locations of some of the mysteries in the "adjacent areas." Many of the other alleged "mysteries" did occur in or closer to the Triangle, but the details of their losses were often inaccurate.

Gaddis's writings started the tsunami of Bermuda Triangle magazine and tabloid articles, books, documentaries, movies, and the popular belief in unknown forces off the coast of the United States. His account of Flight 19 was largely based on the fictional quotations in the *American Legion* magazine article.

Many of the later mysteryans accepted Gaddis's version and then embellished it with their own speculations rather than doing original research. Some added another alleged mystery or two.

My source of information about Flight 19 in Chapter 22 of *The Bermuda Triangle Mystery—Solved* was the official Navy report: "Board of Investigation into five missing TBM airplanes and one PBM airplane, convened by Naval Air Advanced Training Command, NAS Jacksonville, Florida, 7 December 1945, and related correspondence." No one who had declared the loss of Flight 19 to be paranormal or UFO-related used the official Navy report.


NORTH ATLANTIC
SARGASSO SEA
Last Known Approximate Position
Travel Direction, Last Position Unknown
Gaddis, Invisible Horizons: Most of the total vanishments occurred within the Bermuda Triangle; others were within adjacent areas.
Kusche, The Bermuda Triangle Mystery – Solved. Virtually all the "vanishments" (my chapter numbers on the map) in "adjacent areas" had logical solutions when diligently researched. They were nowhere near the Triangle.
SOUTH AMERICA
BRAZIL
BOLIVIA
BAHAMAS
CARIBBEAN SEA
CANARY ISLANDS
CAPE VERDE
MAURITANIA
45° N
30° N
1000
500
0

Map 1. Many of the "mysteries" attributed to the Triangle did not occur in or near it, as shown. Virtually all "mysteries" had solutions, or had no proof that they even occurred, when diligently researched and honestly reported. The numbers are chapters in the *Solved* book.

When I first heard of the Bermuda Triangle in the early 1970s, I realized it was quickly gaining in popularity. There were several reasons for my interest. First, it was an obviously unique and intriguing topic. Ships, planes, boats, and people were said to be disappearing off the coast of the United States! There were no survivors, no wreckage, no SOS, no clues. I had always wanted to write a book, but because I was entering a new profession and had a young family, there had never been a topic that so captured my interest that I was willing to embark on what would obviously be a huge research project.

Second, I was an experienced pilot. By my early twenties I was a commercial pilot, flight instructor, instrument pilot, instrument flight instructor, advanced ground instructor, and flight engineer. I had logged several thousand flying hours, including more than four thousand takeoffs and landings, much of it as an instructor.

Just as much false information today is spread by the Internet and social media, back then we knew that everything we found was not necessarily accurate.

Third, my second master's degree was in library science. Back then I was working in the Reference Department at Arizona State University's Hayden Library, where we were barraged by student requests for information about the Bermuda Triangle for the term papers they had to write. Librarians know how to do research, which in the 1970s was far more difficult than it is with the technologies that exist today.

We could not find much about the Triangle, so I placed an ad in several library journals and soon received a large collection of magazine and newspaper articles, which I made available to the students. In retrospect, those students and many others across the country were a significant factor in the early growth of the Triangle story. Just as much false information today is spread by the Internet and social media, back then we knew that everything we found was not necessarily accurate. Today I still get letters and emails from students who are writing papers, only now they also have my information to use.

It might not seem likely, but pilots and librarians have an important common attribute. They absolutely hate to make a mistake, to be wrong. A librarian's primary job is to help people find the information they seek, which can often be complex and difficult. The inability to find accurate information is failure at the job and embarrassing.

If a pilot makes a mistake, he and others can end up dead. I had known a few people who died in flying accidents: A top-notch crop duster pilot for whom I was a loader while in high school. Two friends who learned to fly the same time as I did crashed on a small dirt runway on a sloping hillside that I often used. One of my high-school flying students died when his father crashed his plane. I remain adamant about not making "misteaks" (a small tweak of humor here).

After deciding in the early 1970s to write a book about the Triangle, my research consisted of locating the earliest accounts of the mystery incidents in legitimate sources rather than accepting the previous writers' versions and speculations. Searching for the mystery incidents was time-consuming, but many were listed in *The New York Times* and London *Times* indexes. I located the articles on microfilm and had them printed. I also received information from Lloyd's of London, the Navy, and the U.S. Coast Guard by U.S. mail. Most of the older incidents had no such thing as an official report.

My experience as a pilot was invaluable when analyzing many of the "mysteries." One case that was reported in a best-selling Triangle mystery book showed the writer's lack of flying knowledge. His story was that a plane flying in the Bahamas had lost the use of its hydraulic system, so the landing gear could not be lowered, but "the plane seemed to be landing as if buoyed up by a cushion of air." Every pilot I tell this story to laughs. Any student pilot with just a few flying hours knows what the "mysterious force" is. *Ground effect* is the increased lift and decreased aerodynamic drag that a wing generates when it is close to the ground or water. It can cause an aircraft to float far along the runway at a slowly deceasing airspeed before it finally settles in.

Another issue that confuses mysteryans is the difference between true north and magnetic north. When I was flying in Arizona in the 1960s, the difference was 12.5 degrees, and we had to adjust for it when navigating cross country. It changes minutely over the years as Earth's magnetic pole slowly moves. The difference is now 10.6 degrees. Mysteryans claim it is a problem in the Triangle because the difference there is near zero and that can confuse navigators, causing them to get disoriented and disappear. Actually, navigation is simplified because adjusting for zero is quite easy. Duh.

My research showed that the mysteryans rarely mentioned anything that conflicted with their "mystery," especially hurricanes and other severe weather. A well-known suicide that explained an abandoned boat found closer to the Azores than to Bermuda was ignored. See incident 46 on Map 1. Many "mystery" locations were thousands of miles away from reality. There was no credible evidence to support the oft repeated tales of only a canary being found on board, or of still-warm meals on the table of an abandoned ship.

In *The Disappearance of Flight 19*, published in 1980, I delved further into that case. After a lengthy search using the most advanced research methods of the time (library reference material, the U.S. mail, and long-distance phone calls), I located the (now deceased) sister and brother-in-law of Charles Carroll Taylor, the instructor pilot of Flight 19. I stayed at their home in Corpus Christi, Texas, several times in the late 1970s as they introduced me to local people who told me what they knew about Taylor. They visited my Arizona home, loved my swimming pool, and became friends with my family, especially my late father. We visited the Grand Canyon. They loaned me a large collection of reports, papers, letters, photos, and other correspondence that Taylor's late mother and aunt had gathered.

An article in the *Corpus Christi Caller* included Taylor's picture and an interview: "Lt. Charles C. Taylor is visiting his mother after 28 month's service aboard a carrier in the South Pacific… He will report to the East Coast for reassignment." I located and interviewed ninety-two people who had known Taylor. Childhood friends. Navy buddies and other personnel who were somehow involved in the events of December 5. The radioman and gunner who had flown with him off the carrier *Hancock* during the Pacific war. They told me he was an excellent pilot and the perfect southern gentleman who was proud to be a U.S. Navy pilot.

Another part of my research was to visit the Confederate Air Force in Harlingen, Texas, on April 3, 1978. (The name was changed to Commemorative Air Force in 2002.) I examined their huge single-engine Avenger torpedo bomber on the ground, then (as a passenger) headed out over the Gulf of Mexico for a loud, exciting, and informative ride.

Two days later I rented a Cessna in Fort Lauderdale (I was still an active pilot back then) and flew the intended route of Flight 19 to the Bahamas, landing for fuel at Walker's Cay, the chain's northernmost island. I then flew back across the Gulf Stream and the Everglades to Key West, Florida, refueled a second time, then flew along the Florida Keys on the way back to Fort Lauderdale.

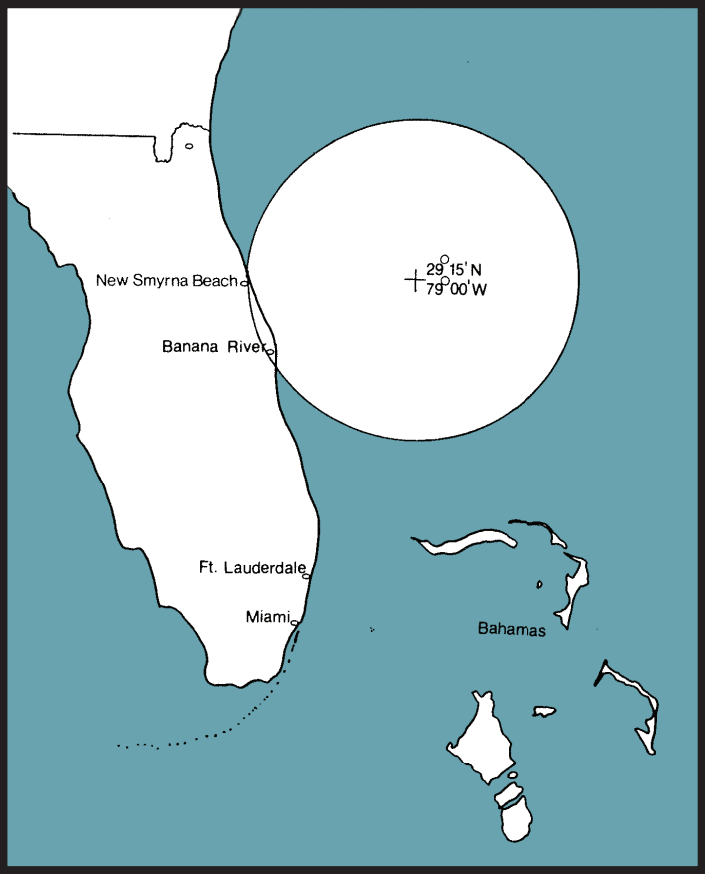
The reason for my seven-hour flight was to see what Charles Taylor had seen on his flight and what he should have seen. Although the training group he was in charge of took off from Fort Lauderdale at 2:10 in the afternoon and headed *east* toward the Bahamas, an hour and a half later he radioed that he was sure he was in the Florida Keys, which are *southwest* of Fort Lauderdale, virtually in the opposite direction they had flown. Map 1 shows the Bahamas, east of Florida, and the Florida Keys, west of southern Florida.

"I don't know where we are," Taylor was heard to say on the radio. "We must have got lost after that last turn. I'm sure I'm in the [Florida] Keys and I don't know how to get to Fort Lauderdale."

He said "both my compasses are out." Taylor did not know where he was, which direction he was flying, or which way to go. He mistakenly identified himself as MT-28, which meant "Miami torpedo bomber." That revealed that, mentally, he was flying out of Miami; those flights were performed in the Florida Keys, not the Bahamas. His correct ID, FT-28, Fort Lauderdale torpedo bomber, was eventually learned.

Dead reckoning navigation, which Flight 19's students were practicing, does not use landmarks. It was used when flying over the ocean, out of sight of land.

Lt. Charles Taylor was the instructor pilot of Flight 19, the five Avenger torpedo bombers from Fort Lauderdale Naval Air Station that disappeared on December 5, 1945.



Map 2. Flight 19's 5:50 PM position fix was a circle of 100-mile radius, several hundred miles north of where Flight 19 should have turned west toward Fort Lauderdale.

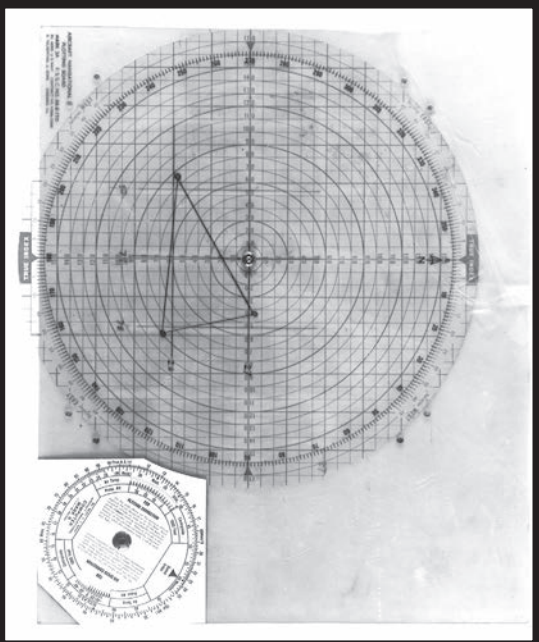


Figure 2. Plotting board used by pilots when flying over water in the 1940s. They mark their estimated course based on the estimated air speed and the estimated wind. A whole lot of estimating goes on when out of sight of land. (Photos courtesy Larry Kusche.)

They fly in specific directions, according to their compass heading, for a specific length of time, based on the estimated wind direction and speed. Progress is marked on an erasable plotting board (see Figure 2). Taylor had extensive dead reckoning experience during his time in the Pacific war.

Prior to flying combat in the Pacific, Taylor had been based in Miami for a year, flying patrol over the Florida Keys and the Gulf of Mexico, watching for German U-boats. After his combat time in the Pacific, he was again based in Miami as an instructor. According to the information sent to me by the National Personnel Records Center, Taylor was "detached" to Fort Lauderdale on November 20, 1945, where the training flights went east to the Bahamas. Taylor reported for duty at Fort Lauderdale the next day, along with hundreds of other officers, student pilots, and enlisted airmen. He was flying again by December 1, but it is not known if he flew the Bahamas route before December 5. My conclusion, based on all my sources of information, is that this was his first time.

On December 5, when Taylor called, he was confused because there *are* parts of the smaller islands of the northern Bahamas (where he actually was) that do look like some of the islands in the Florida Keys. I saw both areas on my flight to the Bahamas and the Keys three decades after Taylor's fatal flight. The official Navy report states that Taylor "allowed himself to be led to believe he was in a position in which he could not possibly have been." Captain William O. Burch, commanding officer of the Naval Air Station, told Taylor's mother and aunt he thought Taylor had confused the string of cays north of the Bahamas with the keys south of Florida.

Some of the writers and websites report that Taylor was confused because his compasses failed, and that is what caused Flight 19 to get lost and eventually disappear. That story, which has largely been accepted, has only added to the mystery. What kind of mysterious force, the mysteryans ask, would cause compasses to fail? What other disappearances has this strange force caused? After all, compasses, whether mechanical or fluid–filled, are known to be extremely trustworthy. Distrusting a compass could be a response for a pilot when the landmarks he sees do not tally with his compasses, especially after he has made some turns. A former Avenger instructor pilot told me how easy it was for him to deliberately disorient a pilot just by doing a few turns to see how quickly he could reorient himself. When I was a flight in-

structor, I discussed with my students the issue of absolutely trusting the compass before I signed for them to take their solo cross-country flights.

Shortly after takeoff from Fort Lauderdale, the planes of Flight 19 were to perform low-level bombing practice runs at Hen and Chickens Shoals, fifty-six miles east of the Naval Station. That would involve turns and altitude changes, which can also be disconcerting, especially at diving speeds and higher g forces.

Believing he was in the Florida Keys where he had previously spent many months flying, Taylor refused to head west, as pilots had been instructed to do if they were lost or confused in the Bahamas. If he had actually been in the Keys, as he mistakenly thought, flying west would have taken them into the huge Gulf of Mexico. He insisted on heading north because he was certain he was south of Florida. One of the stark truths of flying (and hiking) is that the longer a person stays lost, the more confused and the more lost he becomes, which is even worse if night is approaching. (At least a hiker can stop moving to try to get reoriented.)

Flight 19 continued to fly north from the Bahamas, despite at least one of the pilots saying they should fly west. But Taylor's order had to be obeyed; he was the commanding officer. Port Everglades Air Sea Rescue Unit 7 heard several messages between Taylor and the other pilots concerning their estimated position, their compasses, and which direction they should go. As best they could tell, no other plane ever assumed the lead.

Navy personnel had no idea where Flight 19 was until 5:50 PM, a half hour after sunset, nearly four hours after takeoff. An approximate position fix based on some of their radio calls was calculated. Flight 19 was somewhere in a huge area, 200 to 400 miles north of the Bahamas and sixty to 260 miles northeast of Cape Canaveral! (See Map 2.)

By that time, it had turned dark and stormier over the Atlantic. Fuel was running down and a strong wind was blowing out to sea. Turbulence, storm clouds, and the setting sun made it even more desperate. The only chance they had to survive was to immediately turn west.

But none of the Navy stations could contact the flight to let them know where they were and what to do. Radio contact had faded as the planes moved farther away and the sun had set. The atmosphere changes at night, drastically affecting radio reception: static and background noise increases, as does interference from commercial radio stations, especially the powerful music coming from Cuba. No one sent "blind" broadcasts, hoping that someone in the flight would hear it. The storm worsened after darkness fell; they surely were flying on instruments in turbulent air.

An old cliché is that flying is 99 percent boredom and 1 percent stark raving terror. I never did feel the boredom part during my flying career, but on a flight in northern Arizona in 1964 I had a scary hour-long experience in a Piper Comanche, concerned about if I would manage to survive. I was over a mountainous area at 17,500 feet (the plane carried no oxygen), trying at full throttle and full cabin heat to outclimb or outrace the dark thunderhead clouds that were rapidly developing below me as far as I could see. I was in serious trouble, but my anxiety and fear surely were nothing compared to what the men of Flight 19 must have felt, knowing they were doomed to go down in the cold, raging ocean in the darkness, with no chance of survival. I survived by spotting a small break between the huge clouds, diving between them, hoping the break would not close, hoping I would not crash into a peak, and then, miraculously, seeing an abandoned strip on a hillside and making a safe landing. I spent the night at a nearby ranch. I played a lot of pool.

Flight 19 continued to fly north from the Bahamas, despite at least one of the pilots saying they should fly west. But Taylor's order had to be obeyed; he was the commanding officer.

On December 6, 1945, the day after Flight 19's disastrous flight, more than 200 planes and seventeen ships from Florida and the Bahamas went out by dawn, braving high winds and heavy seas. Some small boats and their crews were rescued, but no trace, no one from of Flight 19 could be found.

The Martin Mariner search plane that became a

part of the mystery was seen (from a search ship) to explode in the air on the night of December 5 at 7:50. Mariners were called "flying gas tanks" because they carried almost 2,000 gallons of fuel. The next morning the ocean was so rough that not a trace of the plane or its crew could be found, even though they knew where it had come down. One officer I interviewed said that fumes were occasionally present inside the plane, and that he, while on duty in Greece, had seen a Mariner explode in the air.

Taylor's flying skills and combat experience surely were extensive and heroic during the war, but I did interview two men who were with Taylor other times when he ditched.

The first was his gunner, who told me "Taylor lost his bearings" on June 14, 1944, near Trinidad. They ran out of gas, could not get the raft out before the plane sank, and their depth charges blew up beneath them, but they were quickly rescued.

The other ditch was January 30, 1945. After losing radio contact, Taylor couldn't find Guam. He climbed so they could find him on radar. Almost out of gas, he ditched in a rough sea. He and his passenger spent a wet, cold, turbulent night in a raft and were saved late the next day. Photo 19 in the *Flight 19* book shows Taylor in the raft, being rescued by the USS *Bailey*.

December 5, 1945, was the third time he got lost.

All these years after the publication of both books, I still get the question: "How did you solve the Bermuda Triangle mysteries?" The question I rarely get, which shows a more analytical mind, is: "Did the alleged disappearances actually occur the way the mystery writers said they did?" The answer is no, they did not.

Map 1 shows the Triangle, a thousand miles on a side. While the mysteryans claim it is small and limited, roughly half of the so-called unsolved mysteries occurred far from the Triangle; thousands of miles away in some cases. The numbers on Map 1 are the chapters in *The Bermuda Triangle Mystery—Solved*. "Research" by the mysteryans was so poor that one ship that had been dismasted and lying on its side (obviously a storm victim) in the Pacific Ocean was included as a Triangle mystery.

Some occurred closer to Newfoundland and the route of the *Titanic* than to Bermuda. Many of the "mysterious losses" occurred because of storms, even hurricanes that the mysteryans did not mention.

Today, the Bermuda Triangle is not the hot topic it was forty years ago, but it still gets plenty of interest. The numbers vary considerably, but as I write this, a Google search returns 3,650,000 entries for it; Flight 19 shows 285,000,000; my name shows 11,000. Some of the websites I perused show much of the same old stuff: accepting the mystery stories, then listing various "theories" such as death rays from Atlantis, a drawing of a UFO over Columbus's ship, and so on. Some of the sites do present good information; many refer to my two books.

The concept of mysterious disappearances has become part of the language. In baseball, a batted ball that cannot be caught is said to have gone into the Bermuda Triangle. It is where money that disappeared in the stock market went, and where anyone is who is lost is said to be. The disappearance of Malaysia Airlines Flight 370 in March 2014 in the Indian Ocean has been mentioned as a Bermuda Triangle–type situation, as expected.

The word *solved* in my title elicited comments from some who apparently believe that a solution had to involve UFO captures, death rays, or some other mystery solution. My solution is that the Bermuda Triangle is a fraud, a delusion, and that reality is far more interesting than the phony stories.

Someone wrote that I was a debunker, that my purpose was to snitch on those who I claim got it wrong. That comment is also devoid of reality. When I began my research, I had no idea how true or untrue the mystery stories were. Early on, I hoped to find that the mysteries were true, because I knew the first hardcover book on the market would be a huge bestseller. I wanted mine to be the first! Then reality reared its head. Good, honest research, which takes much more time than cobbling together "mysteries" that previous writers have created, revealed that virtually every incident had been distorted to make it look mysterious. Thus, I did not get the pleasure of having the first hardcover book to be published.

At the end of *The Bermuda Triangle Mystery—Solved*, I stated that the Triangle was a "manufactured" mystery. That was a polite way to say it was a fraud. The "mystery" of the Bermuda Triangle is one of the most widespread frauds that has ever been perpetrated. It was based on poor research and distorted, untrue, inaccurate information that was uncritically copied, embellished, and sensationalized.

Does it matter if people believe that forces "beyond the laws of science as we now know them" are capturing ships, boats, planes, and people, and that scientists, the Coast Guard, Navy, Lloyd's of London, and other experts are said to be baffled by it all? If those alleged unknown forces in the Triangle are

only light entertainment for the masses, does it matter that some people believe in them? So what if they believe in UFO captures, psychic powers, astrology, ancient astronauts, and ads to lose thirty pounds by the end of the month? What is the harm in it? Few of us will ever be affected by whether there are unknown forces in the Triangle or anywhere else.

Actually, there *is* an issue of greater importance than whether "paranormal forces" are at work anywhere. In this age of information explosion and social media, it is worrisome that so many people believe so many things without requiring any supporting evidence, that they employ little skepticism, have such a lack of curiosity, and such a bias toward what they want to be true, that they ignore what is true.

Once false information becomes "common knowledge," no matter how thoroughly it might be shown to be false, the false version will continue to be believed by some, either because they remain uninformed about the correct information or because they refuse to accept any information that is contrary to the beliefs they hold.

The need for skepticism, for paying close attention to detail, is of critical importance in everyday life. A healthy dose of skepticism might have saved billions of dollars from disappearing during the dot com debacle in the early 2000s and the financial meltdown in 2008. It would have kept millions of dollars from vanishing during the more recent Ponzi schemes.

Skepticism and critical thinking are important in politics when voters let their emotions rule rather than becoming informed on the positions of the candidates. It is important in issues of health, such as the vaccination/autism controversy, which is resulting in diseases that were virtually wiped out to start coming back. It is important in the discussion of the use of genetically modified food and the global warming situation.

Skepticism. Critical thinking. Honesty. ■

Larry Kusche is the author *The Bermuda Triangle Mystery—Solved* (1975) and *The Disappearance of Flight 19* (1980). The books set high standards for investigative research and reporting on popular subjects. They demonstrate the need for critical thinking and being a skeptic. He has been a commercial pilot/flight instructor and a technical writer, and he was a founding CSICOP fellow. His first novel, *Return to Marble Canyon*, will soon be published. He has lived in the Phoenix area since the second grade (1947).

Endorsements of Kusche's Decisive Investigation

Editor's note: Prominent scientists, skeptics, naval experts, and historians endorsed Larry Kusche's 1975 book The Bermuda Triangle Mystery—Solved. *Here are some of those comments:*

Carl Sagan, Astronomer: *Your book is a welcome alternative to the standard credulous and uncritical works on the subject.*

Isaac Asimov, Scientist, Author: *Reading it was like drinking a glass of sparkling spring water after being offered nothing but mud.*

T. M. Dinan, Lloyd's of London: *This book is essential reading, for here the mystery is solved.*

Admiral O.W. Siler, Commanding Officer, U.S. Coast Guard: *Your position is wholeheartedly endorsed by the Coast Guard.*

Walter Sullivan, Science Editor, *New York Times*: *Thank goodness there are a few rational human beings dealing with this subject.*

Martin Gardner, *Scientific American*: *Kusche's research is impeccable, his arguments unanswerable. His solution will convince everybody except those simple-minded believers who refuse to listen to anyone except the hucksters of irrationality. . . . I agree with him totally*.

James Randi: *Congratulations on the quite excellent job you've done to bring some rationality to the very aggravating Bermuda Triangle "mystery."*

Philip J. Klass, Author of *UFOs Explained*: *The book should resolve all doubts.*

J. Allen Hynek, Director of the Center for UFO Studies: *Head and shoulders above what else has been written. It is bound to clarify matters for all people who think.*

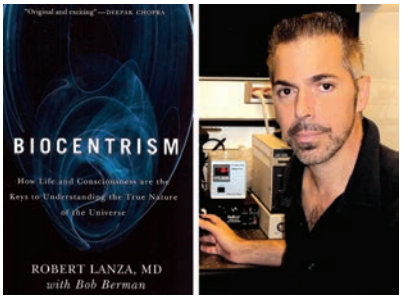
Samuel Eliot Morison, naval historian: *Anyone who has been bemused by the Bermuda Triangle literature, which mostly belongs in the categories of myth and fable, should read Mr. Kusche's book. You will find there an objective estimate of all the alleged mysteries of the alleged triangle, and learn that most of them can easily be explained by natural causes.*

Through Me, the Universe: A Stroll through the Curious Solipsism of Biocentrism

The odd and self-centered biocentrism movement believes the universe is created by consciousness and we are central to it.

DALE DEBAKCSY

If you have religious friends of a scientific bent and you are on Facebook, then you've probably been subjected to the phenomenon that has freely labeled itself biocentrism. Biocentrists believe that the universe is created by consciousness and that almost every unknown in current science can be adjudicated by an appeal to the role living beings have in forging the cosmos with their minds. They couch these beliefs in quantum physics and, unlike more blatant New Age appropriations, the science is good enough to deserve a thorough looking over.


BIOCENTRISM
How Life and Consciousness are the Keys to Understanding the True Nature of the Universe
ROBERT LANZA, MD
with Bob Berman

For people frustrated with the fact that science has not yet explained everything, it offers ready answers. And for a biological community tired of physics being the arbiter of the universe's secrets, it's a chance at the big leagues. The movement began with the work of Robert Lanza, a medical doctor taken with the idea that biology creates reality. In 2010 he published *Biocentrism: How Life and Consciousness Are the Key to Understanding the True Nature of the Universe* with astronomer Bob Berman, and it has since become the key text for a movement seeking a scientifically respectable weapon with which to hack a path back to the sixteenth century using the tools of the twenty-first.

It is, in every way, an odd book. It veers into long stretches of desperate, self-congratulatory autobiography that emerge from nowhere and terminate having done nothing in particular. It throws up walls of Wikipedia facts where they are totally unnecessary and offers no details where they would be crucial to establishing his ideas or discrediting his legion of imagined rivals. It has a thoroughly extraneous chapter about science-fiction films that somehow meanders into the plot of *Peggy Sue Got Married* before limping back into the vague fog from whence it came. At one point, and I am not making this up, it claims that Einstein would have been a more impressive physicist if only he thought more like Dr. Robert Lanza.

It is an odd book.

And yet, for a whole movement of people who want to see the afterlife vindicated by science, and anthropocentrism reestablished as the central

principle of scientific investigation, it remains foundational. Deepak Chopra, ever willing to grind the organ for any ailing monkey with half a step of metaphysical dance left in it, hailed his work as "original and exciting," and it has spawned an impressive array of amateur imitators, a fact all the more remarkable considering that *Biocentrism* doesn't really *prove* anything. It *shows* a number of things, *concludes* a number of others, and then leaves the connecting tissue between the two largely to the imagination, as we'll see. Its argumentative structure is loose enough that it has allowed multiple groups—Catholics and New Agers and disgruntled biologists—to claim it authentically as their own with success following in that somewhat muddled wake.

The method of biocentrism is relatively simple. Take a scientific concept, conflate the terms used to explain the physical nature of that concept and how we interpret that nature, and somewhere in the haze, slip the word "consciousness" into the inevitable resulting maxim. For example, rainbows are an ordered array of photon wavelengths produced by the graded bending of light inside of a rain droplet. The word *rainbow* is also used to describe the visual experience that is our mind's interpretation of that ordered array of photons. Clearly, that interpretation doesn't exist outside of our heads (everybody "sees" a slightly different rainbow). We are necessary for the rainbow-as-interpretation, but Lanza latches onto the repetitious terminology to conclude, "We are absolutely necessary for the rainbow's existence. When nobody's there, there simply is no rainbow." And as such, "What we perceive as reality is a process that involves our consciousness." A redundancy in vocabulary has become a principle of reality creation.

Deepak Chopra, ever willing to grind the organ for any ailing monkey with half a step of metaphysical dance left in it, hailed Robert Lanza's work as "original and exciting."

Now, there is something *like* science to be had here. It is true that particles such as photons exist as a superposed set of states that break down to a single state (or *appear* to if you hold with decoherence theory) under various circumstances. The problem is that Lanza continuously refuses to acknowledge the "various" part of that statement. He speaks nowhere about the space between sensory mechanism and conscious processing, for the very

good reason that superposition, which Lanza needs in order to even begin talking about the role of consciousness in the universe, tends to get crushed in that space. As Yale physicist Abner Shimony has pointed out in the case of visual events, a photon has got to jump through a lot of hurdles before even getting to our retinal photoreceptors—each of which is enough to throttle superposed states into single outcomes—and that's before we even get to the massive issue of the absorption of that photon by rhodopsin, an event that triggers a macromolecular cis-trans realignment and decisively suppresses any lingering superposition far before any conscious processing has happened. For an argument that relies on probabilistic superposition to maintain itself until the mind resolves it into a single reality, focus on the purely mechanical means of pre-conscious state collapse is something of a death blow, and one that Lanza and biocentrism generally, and palpably, have not engaged with.

"Reality is a process that involves our consciousness" is the First Principle of biocentrism, and it is arrived at by a brazen but adorable attempt to pass off an imprecision in language usage as a basic quality of the universe.

"Reality is a process that involves our consciousness" is the First Principle of biocentrism, and it is arrived at by a brazen but adorable attempt to pass off an imprecision in language usage as a basic quality of the universe and a willful dismissal of the brute mechanisms of information collection. The pattern once established, Lanza bravely sticks with it. He runs through—in precisely the same fashion, in precisely the same order—the classic Tree Falling in a Forest conundrum and then jumps to the unavoidable Double Slit Experiment.

Abuse of the Double Slit Experiment is almost *de rigeur* in these sorts of books, and Lanza has nothing new to offer except odd discourses about experiments where atoms prodded by lasers are not allowed to change energy states, an interesting result that he ultimately ascribes to the minds of the observers and not, you know, *the laser*. Clearly, if every person in the room had died at the moment the experiment was turned on, the atoms would have absolutely changed their energy states (except that, under biocentrism, nobody ever dies; more on that presently).

Further, under biocentric explanations, time doesn't exist and neither does space. The argument for the former is that the only reason we really believe that time exists is because of entropy, but that entropy is really just a habit of thinking, a way of describing order and disorder that is prejudiced toward certain results out of mere habit. This is an excellent point if by *entropy* we mean the definition given in the average middle school physical science textbook. But entropy is a mathematically measurable quantity, one without which you cannot predict the free energy and therefore spontaneity of reactions. It is most decidedly *not* merely "our own minds' way of perceiving patterns and order" any more than specific heat or average kinetic energy, and to rely on that blithe sweeping away of a necessary physical quantity via a crude caricature in order to unseat the reality of time is to build a castle on swampland.

There's a Goldilocks argument obliquely thrown in for good measure, and objections of long standing aren't remotely addressed. A lot of things had to go right for us to be here, just as a lot of things had to be right for asteroids and interstellar gas to be here. Yet nobody is calling the universe asteroid- or gas-centric, in spite of the fact that it is overwhelmingly better at making them than it is at making us. The Willy Wonka factory produces Nerds Ropes, but it also produces many other candies, and though the

Nerds Ropes may be the most complicated candy that factory makes, it is rather arrogant of them to claim that they, and they alone, are the reason that factory exists and that, further, it is only by virtue of their perception of the other candies that those candies exist.

This brings us to the fatal insufficiency with biocentrism as it has been laid out in Lanza's book and subsequently: the movement's unwillingness to grapple with the yawning chasm between measurement and consciousness. Measurement of a system undoubtedly changes it, but it is a linguistic sleight of hand to say that, therefore, consciousness changes the universe. If you are a quantum object represented by the superposition of many possible states, there are many things that can force you into one single and measurable state. Photons do it. Thermodynamic interaction with the environment can do it. *Lasers* can do it. Determining one half of a conserved quantity in an entangled pair of particles can do it. None of those things require consciousness, and nowhere does Lanza successfully indicate that the *mind* of the person in the room with an experiment is a contributing factor to the probability-collapsing outcome of that experiment. Rather, we are treated to a series of standard experiments, shown how measurement and interaction seem to matter, and then find, from nowhere, the word *consciousness* slipped in at the chapter summary, as if it had been there all along.

And it is at this point that things go from a misguided but intriguing romp to an out-and-out farce, as biocentrism holds some set opinions about the consequences of its "mind creates reality" mantra that run histrionically off the rails. Since we create reality, time, and space by observing them with our conscious minds, the idea of there being something before or after us is absurd, and therefore, Lanza holds, we cannot die. In what is a perhaps not entirely rigorous statement, he offers, "The mathematical possibility of your consciousness ending is zero." You will stay conscious and connected to everything, forever, the culminating moment of a philosophy that, more than once, relies on, "It just doesn't *feel* right for this not to be true" as its central motivating device.

Biocentrism is an impatience wrapped in a series of linguistic feints dusted with a fine layer of interesting quantum results. Answers aren't coming fast enough, and the ones that are coming are not those we want. We feel like love is inexplicable, and therefore it must be. It sure seems like vagueness in our neural interpretation of an event ought to correspond to and infect the causes of that neural event, and therefore it does. We would really rather not die, and therefore we don't. As philosophy, it can't find its way out of Kant; as science, it pays too little heed to the interactions of particles with non-mental environments. It is a movement that accepts gut feeling over "complex" and therefore not possibly fundamental mathematics (Lanza's scorn for string theory is oddly bitter), founded on a book that wafts mightily between difficult to read self-aggrandizement and scientific over-simplification (the account of Heisenberg's Uncertainty Principle as a battle between our "inner" and "outer" worlds is particularly priceless). It aims for Feynman and settles for Chopra, and the thud is palpable. ■

Further Reading

Though Lanza's *Biocentrism* is the core text of the movement, its uncomfortable thrusts into autobiography make it hard to see the scientific ideas as anything but the result of a particular individual's broken psychology. To evaluate the ideas more objectively, try Lanza's follow-up book, *Rethinking Immortality*, or Lothar Schäfer's *Infinite Potential*, which touches on many of the same points (and features an introduction by—you guessed it—Deepak Chopra). On the web, biocentricity.net does its level best to carry the standard and address the holes in biocentrism that can be plausibly answered, while still staying well clear of anything really damning to the movement.

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The Consensus on Anthropogenic Global Warming

In 2013–2014, only four of 69,604 publishing climate scientists rejected anthropogenic global warming. The consensus on anthropogenic global warming is not 97 percent, as is widely claimed; it is above 99.9 percent.

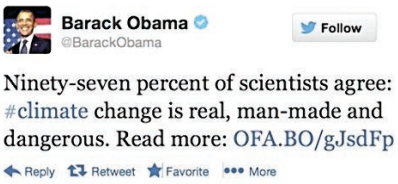
JAMES LAWRENCE POWELL

On May 16, 2013, President Obama tweeted that "Ninety-seven percent of scientists agree: #climate change is real, man-made and dangerous." The President is one of countless people who have come to believe that there is a "97% consensus" on anthropogenic global warming (AGW).

Since it is inconceivable that any climate scientist today could have no opinion on the subject, if 97 percent accept AGW it follows that 3 percent reject it. To those outside of science, 3 percent may seem an insignificant percentage. However, we scientists know that a small minority has often turned out to be right, otherwise there would have been no scientific revolutions. In the 1950s, for example, the percentage of American geologists who accepted continental drift was likely less than 3 percent. Yet they were right.

If there were a 3 percent minority on AGW it would matter, but there is not. The "97% consensus" is false. The percentage of publishing climate scientists who accept AGW is at least 99.9 percent and may verge on unanimity.

How, then, has nearly everyone from President Obama on down come to buy the claim of a 97 percent consensus? The figure comes from a 2013 article in *Environmental Research Letters* by Cook et al. titled "Quantifying the Consensus on Anthropogenic Global Warming in the Scientific Literature." They reported that "Among abstracts *expressing a position* on AGW, 97.1% endorsed the consensus position that humans are causing global warming" (emphasis added). The 97 percent figure went viral and, not surprisingly, the qualifying phrase "expressing a position"—the fine print, if you will—got dropped. But those three words expose the false assumption inherent in the Cook et al. methodology.

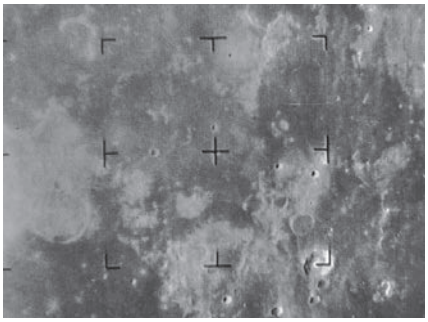


Cook et al. used the Web of Science science-citation research site to review the titles and abstracts of peer-reviewed articles from 1991–2011 with the keywords "global climate change" and "global warming." They classified the articles into seven categories from "(1) Explicit endorsement with quantification" to "(7) Explicit rejection with quantification." In the middle was "(4) No position."

The *sine qua non* of the Cook et al. method is the assumption that publishing scientists who accept a theory will say so—they will "endorse" it in the title or abstract. To count an article as part of the consensus, Cook et al. required that it "address or mention the cause of global warming." Of the 11,944 articles that came up in their search, 7,970—two thirds—did not. Cook et al. classified those articles as taking no position and thus ruled them out of the consensus.

Do we need to know any more to realize that there is something wrong with the Cook et al. method? The consensus is what the majority accept; you cannot rule out a two-thirds majority and still derive the consensus.

Moreover, is it true that scientists routinely endorse the ruling paradigm of their discipline? To find out, I used



the Web of Science to review articles in three fields: plate tectonics, the origin of lunar craters, and evolution.

Of 500 recent articles on "plate tectonics," none in my opinion endorsed the theory directly or explicitly. Nor did a single article reject plate tectonics. This statement was about as close to an endorsement as any came: "Plate tectonics, which shapes the surface of the Earth, is the result of solid-state convection in Earth's mantle over billions of years."

What of lunar craters? As recently as 1964, nearly every scientist who had studied the moon believed that its craters were volcanic. Then in July of that year, the first successful *Ranger* mission returned thousands of photographs showing that the moon exhibits craters ranging in size from the colossal to the microscopic. Except for a few senior holdouts, scientists quickly embraced the meteorite impact theory. A Web of Science search for "lunar craters" today turns up 185 articles stretching back to 1920 (including an overlooked 1921 article by Alfred Wegener that showed convincingly that the craters are due to meteorite impact). I reviewed the abstracts of the most recent 100 articles, which go back to 1997. As with plate tectonics, none explicitly endorsed meteorite impact, nor did any reject it. The closest any came to an endorsement may be this sentence: "It is known that most of the craters on the surface of the Moon were created by the collision of minor bodies of the Solar System."

The consensus is what the majority accept; you cannot rule out a two-thirds majority and still derive the consensus.

Do biologists writing about evolution routinely endorse Darwin's theory? I reviewed the abstracts of articles in the *Journal of Evolutionary Biology* from 2000 through 2014. Of 303 articles, 261 had abstracts. Not surprisingly, none of the 261 rejected the modern evolutionary synthesis; neither did any endorse it. The closest any came may have been this statement: "A long line of biologists have followed [Darwin] in seeing, in the concept of 'descent with modification,' a framework naturally able to incorporate both adaptation and constraint."

Are the sentences quoted in the three preceding paragraphs endorsements or simple statements of fact?

To calculate their 97.1 percent result, the Cook et al. study divided the number of abstracts that they said endorsed AGW (3,896, including 2,909 "implicit" endorsements) by the total that expressed a position (4,014, which included the rejecting articles.) Would the method work for plate tectonics, the origin of lunar craters, and evolution? Since none of the authors of the

articles I reviewed in those fields reject the theory in question and only a handful, if that, could be said to directly endorse it, the Cook et al. method would wind up classifying the vast majority as taking no position and omit them from the calculation. We would be left dividing a tiny number of perceived implicit endorsements, a highly subjective measure, by the same tiny number and wind up with 100 percent, after having ruled out nearly all the scientific literature. We might be left dividing zero by zero.

* * *

Remember that to count an article as endorsing, the Cook et al. study required that it "address or mention the cause of global warming." Climate scientists refer to this as attribution. Some climate articles are about attribution but many are not. Consider these two examples.

In 1993, James Hansen and his colleagues published an article in *Research & Exploration* titled "How Sensitive Is the World's Climate?" The purpose of the research was to "estimate climate sensitivity from observed climate change." In other words, not only did Hansen et al. accept AGW, they were gauging how strong it is, reporting a temperature rise of 3 ± 1°C for doubled CO_2. The abstract included this sentence: "Observed global warming of approximately 0.5°C in the past 140 years is consistent with anthropogenic greenhouse gases being the dominant climate-forcing in that period." The sentence is evidently why Cook et al. classified this article in category 1: "explicit endorsement with quantification."

We know from the history of science that the most important advances come when stubborn facts overthrow the ruling paradigm. This is how scientific reputations are made.

Hansen et al.'s 1992 article "Potential Climate Impact of Mount Pinatubo Eruption" considered the effect of aerosols on global climate, successfully predicting that the injection of sulfur aerosols during the 1991 Mount Pinatubo eruption would temporarily lower global temperature. However, in this article Hansen and colleagues were researching the role of a natural event—volcanic eruptions—rather than the human contribution to global warming. Because of that their abstract did not "endorse the consensus position that humans are causing global warming," as Cook et al. required. The Cook et al. study classified Hansen et al.'s 1992 article as taking no position and ruled it out of the consensus calculation.

James Hansen also had articles in the three endorsing categories and thus is represented in four. But Hansen does not have four different opinions about AGW—he has only one opinion, and we know very well what it is. His articles may use different language according to what he and his colleagues happen to be writing about, i.e., they may seem to "endorse" AGW or not, but these are distinctions without a difference. The Cook et al. classification is not about Hansen's core belief but about the subject of his articles.

Hansen had a total of six articles in Cook et al.'s "no position" category. A number of other prominent climate scientists show up there as well. These include (with the number of articles): R. Bradley (3), K. Briffa (2), E. Cook (5), M. Hughes (2), P. Jones (3), T. Karl (5), M. Mann (2), M. Oppenheimer (3), B. Santer (2), G. Schmidt (3), the late S. Schneider (3), S. Solomon (5), K. Trenberth (7), and T. Wigley (3). Cook et al. ruled them all out of the consensus calculation. Most of these authors, like Hansen, also have articles in one or more of the three endorsing categories. Again, we see that the Cook et al. method is about language and the subject of articles rather than whether their authors accept AGW.

* * *

If scientists do not endorse the ruling paradigm, can we still quantify the extent of a scientific consensus? Yes, we can.

The articles that turned up in the Cook et al. search were not drawn at random but appeared because they answered the search topics "global warming" or "global climate change." The authors in the Cook et al. database were writing *about* AGW. Would they have written about a theory that they believe is false yet never say so?

We can get a further clue using the research category classification that Cook et al. provided. Of the 7,970 "no position" articles, 56.8 percent were on the impacts of global warming, 18.4 percent on mitigation, 17.1 percent on measurements and modeling methods,

and 7.7 percent on paleoclimatology. Would authors write about those aspects of global warming if they believed that AGW is false yet never say so? What would be the point?

We know from the history of science that the most important advances come when stubborn facts overthrow the ruling paradigm. This is how scientific reputations are made. It is why we remember Alfred Wegener and not his opponents. A scientist who has evidence that AGW is false will be eager to say so and to present that evidence. Who among us would not love to be that scientist!

Putting all this together, I argue that we can judge the extent of the consensus by the number of articles that explicitly *reject* AGW. Cook et al. found seventy-eight, 0.7 percent, that did so. From that one can infer that the authors of 99.3 percent of the articles in the Cook et al. database accept AGW. This would be the average over the twenty years of their survey. More recently, the percentage of acceptance has grown even higher.

I used the Web of Science to review the titles and abstracts of peer-reviewed articles from 2013 and 2014, adding the search topic "climate change" to "global climate change" and "global warming." Of 24,210 abstracts, only five—one in 4,842 or 0.021 percent—in my judgment explicitly rejected AGW. Two of the articles had the same author, so four authors of 69,406 rejected AGW. That is one in 17,352, or 0.0058 percent.

This result would allow the claim that 99.99 percent of scientists publishing today accept AGW. To be conservative, I prefer to say above 99.9 percent.

Excluding self-citations, only one of the five rejecting articles has been cited and that article only once.

Remember that the 99.9 percent figure does not represent what we usually mean by consensus: agreement of opinion. Rather it is derived from the peer-reviewed literature and thus reflects the evidence therein. It tells us that there is virtually no publishable evidence against AGW. That is why scientists accept the theory.

The consensus on anthropogenic global warming is not 97 percent. Instead, publishing scientists are close to unanimous that "global warming is real, man-made, and dangerous," as President Obama put it. ■

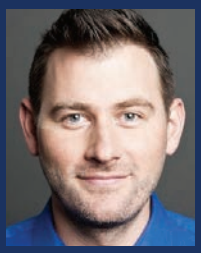
Note

I have a paper under review in *Environmental Research Letters* in which I critique the Cook et al. paper. See jamespowell.org and please leave comments in the forum.

James Lawrence Powell is author of *Four Revolutions in the Earth Sciences* (reviewed in our May/June 2015 issue) and *The Inquisition of Climate Science*. He is executive director of the National Physical Science Consortium. He has been president of three colleges and of the Franklin Institute and the Los Angeles County Museum of Natural History. He is also a former member of the National Science Board and a newly elected fellow of the Committee for Skeptical Inquiry.

POINT OF INQUIRY
WITH JOSH ZEPPS & LINDSAY BEYERSTEIN

For in-depth interviews with the most fascinating minds in science, religion, and politics, join *Point of Inquiry* cohosts Lindsay Beyerstein and Josh Zepps at pointofinquiry.org.



Josh Zepps (cohost) is a new media pioneer; a journalist serving as a founding host and producer at the online talk network HuffPost Live, following hosting stints with such outlets as Bloomberg TV, the Discovery Channel, and as an anchor for CBS's Peabody Award-winning *Channel One News*.

Lindsay Beyerstein (cohost) is an award-winning investigative journalist and staff writer for *In These Times*. Her work has appeared in places such as *The New Republic, Reuters, Slate, Salon, Ms. Magazine*, and *The New York Press*. Wait to see what stories she tells with her guests on *Point of Inquiry*.

We Are All GMOs

Implications of New Research on Horizontal Gene Transfer

Increasing evidence that gene transfer across huge evolutionary distances is common in animals, including humans, provides a strong retort to the claim that GMOs are "unnatural."

MATAN SHELOMI

Humans have been modifying the genomes of plants and animals for millennia with techniques ranging from cross-breeding to irradiation. But these methods and their products do not seem to raise the same level of public outcry as transgenesis, which is the ability to directly move genes between organisms without sexual reproduction. An explanation for the unequal opposition to such genetically modified organisms (GMOs) is the idea that transgenesis is more "unnatural" (Pivetti 2007). Splicing genes from a flounder into a tomato (Hightower et al. 1991) or from a bacterium into rice (Tang et al. 2015) is seen as posing unspecified risks beyond those of conventional breeding because, while plant and even some animal hybrids exist in nature (Zhang et al. 2014), cross-kingdom hybrids do not. Surveys suggest the more "dissimilar" the organisms whose genes are being shared (Dragojlovic and Einsiedel 2013), and the more artificial the methods used to move the genes (Kronberger et al. 2014), the more unnatural the food will appear and the more reluctant consumers will be to eat it, especially if one of the organisms is an animal (Frewer et al. 2013).

Some of this fear is supported by concepts taught in secondary school– and college-level biology textbooks (Zeigler 2011; Alberts et al. 2013). Among animals, cross-species breeding is taught to generally fail or produce infertile hybrids such as mules; among plants, it only works for closely related organisms (Morris et al. 2013). Horizontal gene transfer (HGT), or the natural movement of genes from one organism to another without sexual reproduction (sound familiar?), is taught as being "rare among eukaryotes [animals, plants, fungi, and protists] but common among bacteria" (Alberts et al. 2013). When HGT between domains of life is taught, it is often limited to the ancient, one-time transfers of mitochondrial and chloroplast genes from bacteria to eukaryotes (Reece et al. 2012; Morris et al. 2013). Even when HGT among eukaryotes is noted, the emphasis is still on unicellular organisms (Fitzpatrick 2012). The assumption is that the evolution of separate, distinct sex cells in multicellular life posed unambiguous restrictions on HGT (Doolittle 2000). Both laypersons and many scientists thus believe that the sharing of genes over large phylogenetic distances, especially between animals, is rare or even impossible and that HGT is purely in the domain of unicellular life. Since genetic engineering is artificial HGT between two organisms of seemingly any evolutionary distance, it is accordingly seen as an unnatural violation of these laws: the creation of something that could not arise naturally even in theory.

Yet what if these basic premises are wrong? Analyses of the ever-rising number of published genomes and transcriptomes for multicellular life have revealed unexpected numbers of functional genes whose sudden appearance in a clade (a group of organisms assumed to share a common ancestor) suggests they jumped across great phylogenetic distances rather than evolving from a common ancestor: in other words, HGT. Each new genome can be a source and/or recipient of new genes, meaning the accuracy and power of HGT searches

improves with each new sequenced organism (Paganini et al. 2012; Boto 2014). This growing body of research suggests horizontal gene transfer across domains is far more common than previously thought, including in metazoans (Dunning Hotopp 2011; Syvanen 2012; Schönknecht et al. 2014), where HGT's prevalence in vertebrates and invertebrates does not differ significantly (Crisp et al. 2015). The suggestion is that HGTs may be ubiquitous rather than uncommon in all forms of life, even animals.

Yes, animals includes us: you, me, and the heads of Monsanto and Greenpeace alike. A study published this March conservatively estimated that primates have on average thirty-two foreign genes per species (there are thirty-nine in humans), with maximum estimates up to 109 in primates and 145 in humans from sources including plants, fungi, protists, bacteria, archaea, and even viruses (Crisp et al. 2015). These jumped genes may even have shaped our own evolution: the ABO-blood group system in humans is hypothesized to have been acquired horizontally (Brew et al. 2010), along with some fat mass and obesity-associated proteins found only in humans and algae (Robbens et al. 2008). Within our DNA are genes we did not inherit but that were acquired laterally from organisms across vast distances of evolutionary space. We are transgenic organisms—and everything else might be too.

Thus the idea still taught in textbooks—that HGTs almost never happen in multicellular life—is a misconception. HGTs' perceived higher prevalence in microbes may have been an artifact of the greater number of sequenced microbial genomes: an error that is rapidly being corrected (Keeling and Palmer 2008; Boto 2014). Acceptance among scientists that cross-domain and animal HGT is a natural process "both ancient and ongoing" (Crisp et al. 2015) will not only broaden studies into the field, but it also conveniently erodes the foundation of the *argumentum ad naturum* against GMOs.

Consider Bt crops, in which an insecticidal gene from the bacterium *Bacillus thuringiensis* is inserted into plant genomes (Vaeck et al. 1987); or golden rice, which contains bacterial (*Erwinia uredovoia*) and daffodil genes for beta-carotene (Tang et al. 2015). Consider also the first GMO sold for human consumption, the Flavr Savr tomato, created by inserting a duplicate but antisense copy of the tomato's own polygalacturonase enzyme (technically making it cisgenesis not transgenesis) into the genome to improve shelf life (Bruening and Lyons 2000). These varieties have been extensively and successfully tested for safety (Potrykus 2012; Helassa et al. 2013; Naranjo 2014), yet their *in vitro* origin still repels would-be consumers (Knight 2009), with Flavr Savr eventually declared a commercial failure (Bruening and Lyons 2000). We now know, however, that the HGTs responsible for these lab-created strains could just as easily have occurred in nature. *B. thuringensis* is a widespread microbe found on plant leaf surfaces (de Maagd 2015). Given the association of symbioses with HGT events (Dunning Hotopp et al. 2007), *B. thuringiensis* genes could theoretically have transferred into a plant on their own given enough time and opportunities. One of the first discovered animal HGTs was of a carotenoid biosynthesis gene transferred from fungi to pea aphids (Moran and Jarvik 2010), a similar HGT in terms of gene family and phylogenetic distance to the ones involved in golden rice (Tang et al. 2015). Finally, while Flavr Savr's production involved only one species, natural HGTs of polygalacturonases were recently documented between highly dissimilar organisms, such as transfer from fungi to beetles (Kirsch et al. 2014) and proteobacteria to stick insects (Shelomi et al. 2014). In other words, while the techniques that created the aforementioned GMOs were artificial, fully natural versions of these mechanisms exist, and transgenic events covering similar genes over similar or greater evolutionary distances have already happened. The trait transfers induced in many GM crops could theoretically arise without any human intervention at all.

Within our DNA are genes we did not inherit but that were acquired laterally from organisms across vast distances of evolutionary space. We are transgenic organisms—and everything else might be too.

One important caveat is that natural HGT events in eukaryotes mostly still involve microbes or at least fungi. HGT between two animals is rare (for now) and requires organisms be in close contact with each other. An example is the transfer of insect genes to bats either from respective parasite-host or prey-predator interactions (Tang et al. 2015). Thus, even though the *evolutionary* distance involved need no longer be seen as a problem, an arctic flounder to tomato HGT in nature remains highly unlikely given the *ecological* distance between the two (Hightower et al. 1991). This does not change the basic facts about GMO safety, though it will surely be a point anti-GMO activists seize upon.

When seen as HGTs, GMOs recover much of the "naturalness" denied to them by their opponents, and a key (though by no means sole or largest) motivator to anti-GMO fear is weakened. Experimental evidence suggests increasing public knowledge of biological facts reduces the role of subjective perceptions of naturalness in public approval of GMOs, changing the discussion toward one about quantitative risk and benefit assessments (Mielby et al. 2012), at which point one can bring up the large and ever expanding body of evidence for GMO safety (Snell et al. 2012; Klümper and Qaim 2014; Nicolia et al. 2014). Thus education about the incredible sources of genetic variation in the natural world, such as the naturalness of HGTs among plants and animals and even humans, may greatly reduce the "unnatural" appearance of transgenesis and improve public acceptance of GM crops . . . though improving awareness among biologists of the ubiquity of HGTs is a necessary first step. ■

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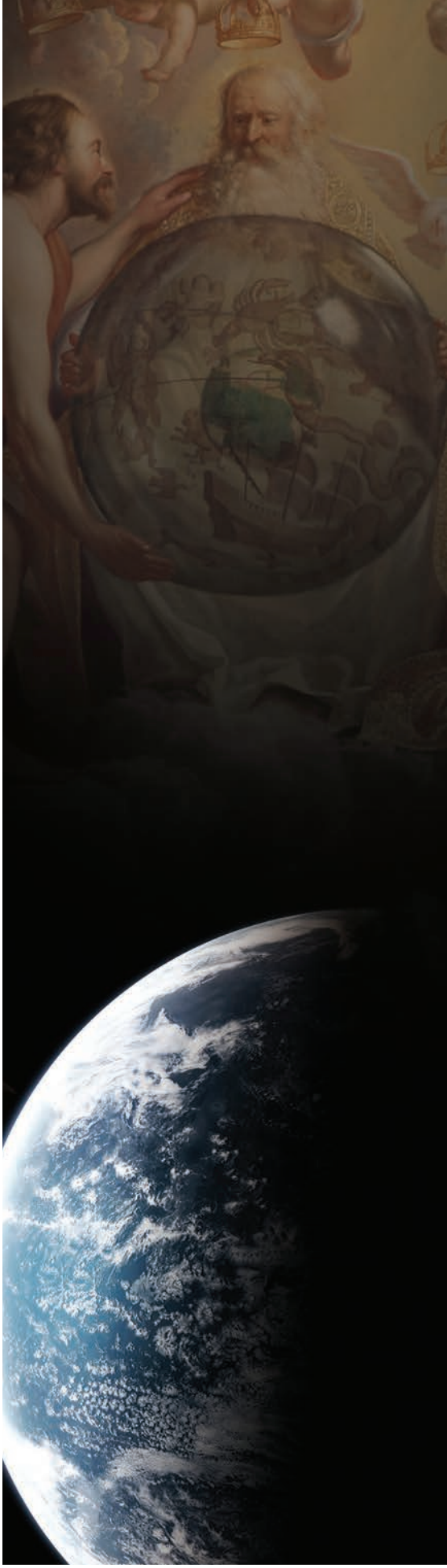
The Devil and the Details

Why young-Earth creationists may not fully realize what they believe.

JÉRÉMIE HARRIS and EDOUARD HARRIS



In recent decades many branches of Judeo-Christian theism have adapted to make room for the increasing body of scientific evidence in favor of evolution by natural selection. Theists typically achieve their sought-after compromise between science and religion by arguing for other-than-literal interpretations of the biblical account of Creation rendered in Genesis. This relatively modern approach has been addressed at length by many of the foremost atheist and skeptical thinkers of our day. With few exceptions, however, secularists have tended to avoid confronting the more fundamentalist perspective of young-Earth creationism head-on.

Why should this be? Certainly, the average skeptic's reluctance to engage in high-profile debates with young-Earth creationists does not arise from want of evidence for an ancient Earth. Indeed, many apparently independent lines of evidence, drawn from numerous distinct scientific disciplines, all provide strong indications that both our universe and our planet are very old.

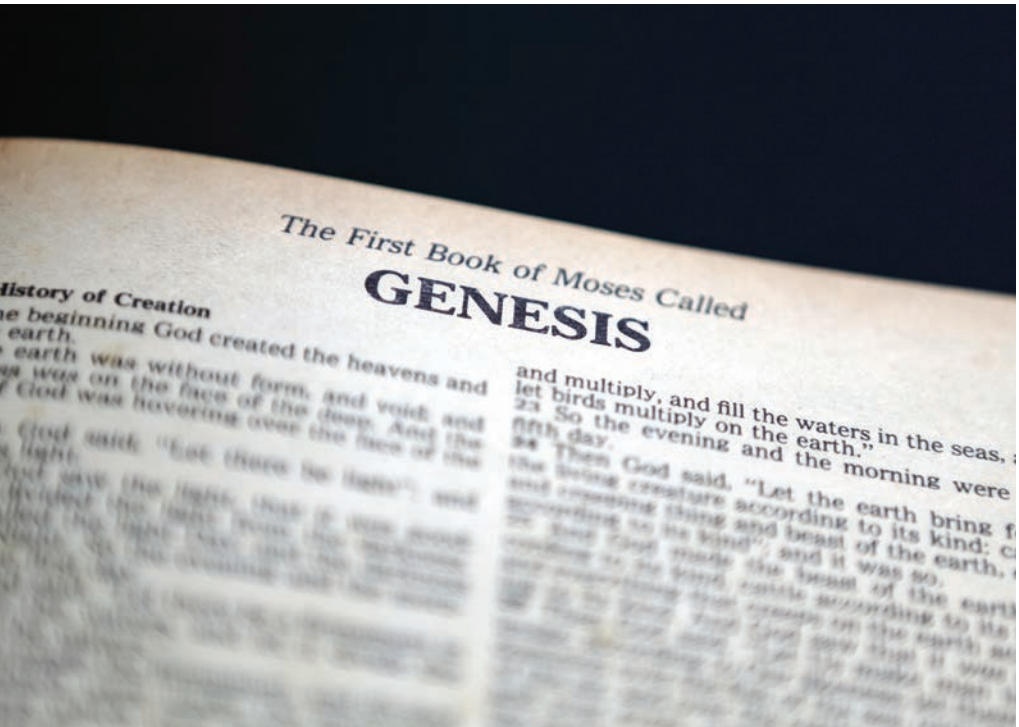
From geology, radioisotopic dating of the oldest known mineral samples on Earth suggests a planetary age on the order of four billion years or more (Dalrymple 2001). Multi-million-year tectonic shifts, along with evidence of glaciers advancing and retreating over tens of thousands of years, constitute further evidence that our planet's age is, at the very least, many times greater than what one would infer from the Biblical account (Zhao et al. 2002; Royden et al. 2008).

From physics, our observation of stars so distant from the Earth that their light must have travelled billions of years to reach us also points to an ancient universe (Ohyama and Hota 2013). From biology, the nearly paradoxical oneness and diversity of nature, attested to by countless genomic analyses, constitutes inescapable evidence for the highly gradual process of evolution by natural selection, which similarly requires that our planet be far older than the mere ~10,000-year age that one obtains from literal readings of Genesis (Wall et al. 2005). The evolutionary perspective is further supported by the existence of an extensive and remarkably consistent fossil record (Benton and Ayala 2003), and by the large number of vestigial traits retained even by anatomically modern humans as relics of a distant evolutionary past not quite left behind (Dubrow et al. 1988).

What, then, accounts for the disinclination to engage young-Earthers on this issue? There are two answers. First, many skeptics and secularists contend that a debate over the age of the Earth—one of the most firmly established facts in science today—serves only a marginal educational purpose, at the expense of providing a microphone to a brand of theism bent on leaving believers in a modern-day scientific Dark Age. The second reason, which is often unacknowledged and rather more concerning, is that many scientists and skeptics believe that there is little to be done in the face of a number of strategies adopted by young-Earth apologists in defending their faith. Chief among these is the argument that nature cannot, and should not, be taken at face value. It is imagined that the very physical laws that govern our universe may have changed since Creation, rendering fruitless any attempts to extrapolate the state of affairs in the early universe from scientific observations made in the present day.[1]

In this spirit, young-Earthers posit one of two scenarios: first, that all the existing evidence that points to an ancient Earth has been "planted" by the Devil with the intention of deceiving mankind. Second, that Creation may have proceeded in the absence of Satanic influence, God himself having chosen to produce evidence pointing to an old Earth for reasons known only to him. Here we examine each of these views in turn and show that either path leads inexorably to an endpoint incompatible with the Judeo-Christian worldview.

An obvious question presents itself: With Satan's hands on so many of the universe's most fundamental dials, what room is left for God in this picture?


The First Book of Moses Called
GENESIS
History of Creation
beginning God created the heavens and
earth.
earth was without form, and void, and
was on the face of the deep. And the
of God was hovering over the face of the
God said, "Let there be light":
and multiply, and fill the waters in the seas,
let birds multiply on the earth."
So the evening and the morning were
Then God said, "Let the earth bring
according to its kind:
and beast of the earth,
and it was so.
made the beast of the earth

Satan's Guiding Hand

We begin by considering the adversarial view of nature taken by those young-Earthers who argue that Satan may be responsible for the existence of evidence that contradicts the Creation timeline presented in Genesis. This perspective necessarily places the Devil in a position of commanding influence over the natural world. Indeed, it requires that Satan be imagined to exact total control over virtually every physical law governing the universe, at least for a time. After all, manipulation of both the speed of light and the rate of expansion of the universe would appear to be prerequisites to convincing modern-day astronomers of the existence of stars billions of light-years away. Likewise, the gravitational constant would have to be modified with exceeding care and precision to allow for the formation of stars and galaxies as they can presently be observed, within the time allotted by Genesis (Adams 2008). The rates of nuclear decay associated with every radioisotope known to science would similarly have to be tuned just so.

An obvious question presents itself: With Satan's hands on so many of the universe's most fundamental dials, what room is left for God in this picture?

But another problem with this position is more practical. The assumption that Satan has influenced so many fundamental features of the universe is such a strong one that one may as well ignore *any* evidence that disagrees with the biblical account of Creation, simply *because* it disagrees with Genesis. This perspective therefore reduces to pure tautology. While it explains any evidence that could possibly be advanced for an ancient universe within a theistic framework, it makes no predictions, is therefore untestable by definition, and hence is just as worthy of consideration as any other superstition.

Young-Earth apologists often address the scientific position by challenging the notion that human scientific knowledge can even be trusted, given that human intuition arose, on

the naturalistic view, through a blind evolutionary process. While this challenge is not entirely without merit, on this point the theistic perspective is actually open to an even stronger objection. If Satan is imagined to exist—and, further, if he is thought to have exerted substantial influence over the natural world—then there is presumably no guarantee whatsoever that the Bible itself was not authored by the Devil. After all, would this not be a far simpler task than that of meticulously fine-tuning the physical constants of the universe for the sole purpose of convincing naive human beings of the inaccuracy of that very Bible?

A final problem with pointing to Satan's influence to explain the wealth of evidence for an ancient Earth has to do with biology. There exist gene sequences, shared among different species, that change slowly over evolutionary time at rates that can be estimated empirically. By comparing these special sequences, one can reliably estimate the amount of evolutionary time that separates two species; it becomes possible to gauge the approximate date at which the two species most recently shared a common ancestor. Using this technique, the date of human-chimpanzee divergence has been placed at roughly six million years ago (Stauffer et al. 2001). Hence, the human genome is itself one of the numerous pieces of scientific evidence for an ancient Earth. As a result, if Satan is to be held to account for any evidence pointing to an old Earth, he must simultaneously be credited with the creation of the human species. Needless to say, this possibility does not align neatly with the broader Judeo-Christian perspective.

Not-So-Constant Constants

The second line of the argument often adopted by young-Earth creationists to explain the existence of evidence suggesting a multi-billion-year age of the Earth holds that the physical laws governing the universe may not have applied, in their present form, for all time. Young-Earthers explain the isotopic ratios obtained from radioactive dating of ancient mineral samples by asserting that the *rates* of radioactive decay were once significantly greater than they are today. In essence, the claim here is that the Earth was "aged" at an accelerated rate prior to humanity's arrival on the scene. Similarly, many claim, light from exceedingly distant stars may have reached us in only a few thousand years if the speed of light had once been significantly greater than it is today. Those arguing for this view suggest that God alone was involved in the creation process. They propose that the arrangement of the universe into its present configuration, which strongly suggests an ancient date of formation, was simply a consequence of his plan.

There is a profound problem with this perspective, however. The most successful and influential of our planet's civilizations are precisely those that have accepted the constancy of physical laws as a basic operating assumption. Civilizations that embrace this view—and make predictions based upon it—invariably achieve a position of competitive advantage over those that fail to do this. Even in the business world, the most successful companies in existence base nearly all of their decision making on the assumption that the physical laws of today will continue to hold tomorrow: the iPad, for example, is designed with the assumption that the laws of electricity and magnetism governing its operation will hold indefinitely (or at least up to the expiration of the warranty).

Hence, God apparently rewards human beings for assuming that the constancy of all physical laws will hold indefinitely into the future. However, the view endorsed by proponents of the young-Earth narrative must be that he will punish these same humans for assuming that this rule should apply to the past. Further, this position ultimately requires that young-Earthers believe that God created the human species in his image—as primates with a decided proclivity for extrapolation—and proceeded to present mankind with information from which could only be extrapolated an ancient age for the universe, in direct contradiction with his own scripture. In either case, God must be responsible for presenting humanity with facts that strongly indicate the inaccuracy of the Biblical narrative, when these facts are examined using the very intellectual faculties with which he himself has imbued us.

By conferring upon our species a desire to learn, an ability to reason, and a tendency to extrapolate, God deliberately leads humanity to conclude that the account of Creation rendered in Genesis is false.

The portrait of God unwittingly painted by young-Earth creationists arguing along these lines is therefore a distinctly sadistic one. By conferring upon our species a desire to learn, an ability to reason, and a tendency to extrapolate, God deliberately leads humanity to conclude that the account of Creation rendered in Genesis is false. The conspiratorially minded deity that must therefore be postulated on this view is difficult to reconcile with the benevolent God of Abraham. Indeed, it would appear that the God of this argument, and the Devil of the last, are different in name only.

Taking Things Literally

As we have seen, the literal reading of Genesis that motivates the young-Earth creation movement cannot be reconciled with the broader theistic view of the biblical god as a benevolent and loving friend to humanity. This should come as no surprise even to the most ardent theist, since an absolute, literal reading of the Bible simply cannot be true.

More generally, one might ask, how *should* the world look if a literal reading of Genesis were accurate? Certainly, the totality of scientific history in the past 500 years would be completely unrecognizable. The discoveries of vestigial traits and shared genetic sequences among virtually all organisms would never have been made. Neanderthal cave drawings discovered throughout Europe would never have surfaced. The fossil record, radioactive dating, and all other direct scientific evidence for an ancient Earth would be similarly nonexistent.

Instead, conclusive evidence suggesting that events such as the Exodus actually occurred as described in scripture should be plentiful, or at least apparent. One might also be entitled to expect the conspicuous absence of any indications that humans have been present on Earth prior to the past ten thousand years or so. The geographic distribution of species should also be far more homogenous: with all the Earth's animals in one place during the Great Flood, every part of the planet with the same climate should maintain an approximately constant ratio of wild pigs to camels, for example. Further, all existing plant species should be immune to immersion in water for extended periods of time, since these also must have survived the flood intact. None of these predictions are realized on Earth in the present day; therefore, a reasonable fully literalist take on Genesis cannot be reconciled with observed reality.

For these reasons, the only way to bridge the biblical-empirical divide is to challenge the laws of nature themselves, or our very ability to reason and draw valid conclusions about the world around us. We note in this regard that this is precisely the strategy adopted by young-Earthers, but that those advancing this perspective seldom apply this super-skepticism to any domain outside religious apologetics. How often, one might wonder, would the average young-Earther second-guess whether to jump off a building in the belief that the law of gravity may be divinely suspended, if only for a moment?

The literal reading of Genesis that motivates the young-Earth creation movement cannot be reconciled with the broader theistic view of the biblical god as a benevolent and loving friend to humanity.

A critical double standard exists between theists and secularists on the question of ultimate origins. While young-Earth creationism primarily aims to show that the Genesis scenario is *possible* by arguing for the existence of reasonable doubt on the naturalistic view, the same is not true of more secular perspectives. Origin scenarios that do not depend upon the existence of god(s) are expected to provide proof positive of their correctness. They are therefore held to a significantly higher standard of evidence than religious accounts of Creation—one that they have largely met, to their overwhelming credit. ■

Note

1. This position is explored in great detail by young-Earth apologist Ken Ham, among others, on his organization's website (https://answersingenesis.org/age-of-the-earth/).

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The Search for Negative Evidence

By their nature, paranormal claims depend not on positive but negative evidence, by which proponents attempt to use mysteries ("the unexplained") to support their beliefs. In contrast, scientists seek to use positive evidence to solve mysteries.

JOE NICKELL AND JAMES MCGAHA

Everyone loves a mystery. Solve one in science, and accolades are forthcoming. Not so, however, in the realm of the paranormal, where evidence, logic, and theories are often stood on their heads. Whereas forensic scientists, say, begin with the evidence and let it lead to the most likely solution to a mystery, "parascientists" typically begin with the desired answer and work backward to the evidence, employing confirmation bias: They look for that which seems to confirm their prior-held belief and seek to discredit whatever—or whoever—would argue against it.

For example, in the paranormal field of cryptozoology (a term coined by Ivan T. Sanderson to describe the study of "hidden" or unverified animals [Heuvelmans 1968, 508]), proponents of Bigfoot offer a large quantity of evidence. Unfortunately, it is of very poor quality: eyewitness reports, footprint casts, hair samples—just what is attributable to misperception or deception. It is all questionable evidence because, hoaxes aside, neither a live Bigfoot nor a carcass nor even a DNA specimen is available for scientific study.

The same situation holds true for other claims. They include psychic phenomena; ghosts, poltergeists, and demons; flying saucers and aliens; cryptids, such as the Loch Ness monster; spontaneous human combustion; faith healing and weeping statues; the Devil's Triangle; and so on and on. Mainstream science has not verified as genuinely paranormal any of these objects, entities, or occurrences.

Arguing from Mysteries

Parascientists usually take a different tack. For them, investigation is not a quest to *explain* a mystery (what they deride as "trying to explain it away") but rather to *collect* mysteries about whatever paranormalities they believe in, by which they hope to convince others there must be "something to it." In short, they are not detectives but mystery mongers.

For them, the mystery is essentially an end point rather than a beginning. If it is not readily explained, they do not blame a lack of evidence; instead they suppose thereby that something has been established: "We don't know what caused oil to appear on the statue; therefore, it must be a sign from God." But this is a type of logical fallacy known as *argumentum ad ignorantiam*, an argument from ignorance—that is, drawing a conclusion from a lack of knowledge. One cannot say "We don't know" and then assert that therefore we do know.

And yet that very faulty reasoning is behind most paranormal claims: "We can't explain what caused *a*; therefore, it's likely *b*," where *a* is a hairy-monster sighting or hovering light or an unexpected medical cure, and *b* is presumed to be, respectively, a Bigfoot, or flying saucer, or miracle. Actually it might instead be, again respectively, an upright-standing bear, Venus seen through layers of atmosphere, or the result of prior medical treatment.

Negative Evidence

As psychologist Ray Hyman (1996, 23) observed of one paranormal field: "The history of parapsychology is replete with 'successful' experiments that subsequently could not be replicated." Pointing out that so-called remote viewing and other supposed forms of ESP were defined *negatively*—that is, as an effect remaining after other normal explanations had supposedly been eliminated—Hyman noted that a mere glitch in the experimental data could thus be counted as evidence for psychic phenomena. "What is needed, of course," he said wisely, "is a positive theory of psychic functioning that enables us to tell *when psi is present and when it is absent*" (emphasis in original). He added, "As far as I can tell, every other discipline that claims to be a science deals with phenomena whose presence or absence can clearly be decided."

This requirement—this need—for positive rather than negative evidence is ignored or dismissed by the mystery mongers. In the titles of their books and TV documentaries, they trot out such words as *unsolved*, *unexplained*, *unknown*—presenting not mysteries to be investigated and solved but supposedly eternal enigmas that prove (by arguing from ignorance) the existence of the paranormal.

Consider, for example, the claims of miraculous healings at Lourdes, the French healing shrine. Claims there are derived not positively but from those cases that are held to be "medically inexplicable"—a classic argument from ignorance. (In 2008, however, the International Medical Committee of Lourdes announced that the physicians' panel would no longer be in the "miracle" business, thereafter only indicating whether a case is "remarkable." They will not be inferring a miracle from "medically inexplicable" [Nickell 2013, 183–185].)

Perhaps nowhere is negative evidence sought and promoted more avidly than by UFOlogists, whose very subject of study begins with the word *unidentified*.

Elsewhere, in "miracle" and other paranormal claims, the appeal to negative evidence remains all too common. For example:

- Grant Wilson, who partnered with Jason Hawes in TV's *Ghost Hunters*, says their approach to ghost hunting was to "end up with only those things you can't explain away" (Hawes and Wilson 2007, 6).
- Larry Arnold (1995, 463), in his book *Ablaze! The Mysterious Fires of Spontaneous Human Combustion*, states unabashedly: "I am the first to admit that SHC [spontaneous human combustion] defies common sense and smacks of the unknowable. I don't have all the answers to it; I may have none of the answers. And certainly, I don't have all the pieces to this jigsaw of enigmas." Nevertheless, he concludes, "What I can say with confidence is this: Spontaneous (as well as preternatural) human combustibility happens, though it has remained hidden."
- Crop circle advocates have suggested various "theories" to explain the supposedly inexplicable patterns in English grain fields (despite extensive evidence of hoaxing [Nickell 2004, 115–122]). Ken Rogers of the Unexplained Society opines, "The circles are indeed the result of a UFO landing to probe the crops. There is no other explanation . . ." (qtd. in Randles and Fuller 1990, 16).

Unidentified Flying Objects

Perhaps nowhere is negative evidence sought and promoted more avidly than by UFOlogists, whose very subject of study begins with the word *unidentified*. Prominent among such collectors was Charles Fort (1874–1932). Sometimes considered the "first" UFOlogist (Clark 1998, I: 420), Fort was an armchair purveyor of strange mysteries. Having come into an inheritance that allowed him to indulge his hobby, he spent his last twenty-six years scouring old periodicals for reports of unusual occurrences—including anomalous aerial phenomena—that he taunted "orthodox" scientists to explain (Fort 1941). Not only was his evidence anecdotal and his approach non-investigative, but his "documentation was not always completely accurate" (Gross 2001, 204).

Nevertheless, Fort is the darling of many UFOlogists and other collectors of phenomena that supposedly "defy natural explanation," what they term "Fortean phenomena" or "Forteana," named after him (Guiley 2001, 212–213; Gross 2001, 203–205; Clark 1998, 420–425).

One of history's top UFOlogists was astronomer J. Allen Hynek (1910–1986), once a consultant and self-claimed "debunker" on the U.S. Air Force's UFO-investigating Project Blue Book. Hynek (1977, 7–9, 17) became impressed that, at first, 23 percent of UFOs he studied remained "unknowns" and—going on to found the Center for UFO Studies (CUFOS)—he embraced the negative evidence:

> The transformation from skeptic to—no, not believer because that has certain "theological" connotations—a scientist who felt he was on the track of an interesting phenomenon was gradual, but by the late '60's it was complete. Today I would not spend one additional moment on the subject of UFOs if I didn't seriously feel that the UFO phenomenon is real and that efforts to investigate and understand it, and eventually to solve it, could have a profound effect—perhaps even be the springboard to a revolution in man's view of himself and his place in the universe.

Hynek nevertheless grew cautious about the extraterrestrial hypothesis, noting that it "runs up against a very big difficulty, namely, that we are seeing too many UFOs. The earth is only a spot of dust in the Universe. Why should it be honored with so many visits?" Instead, he said, "I am more inclined to think in terms of something metaterrestrial, a sort of parallel reality," positing "that UFOs are related to certain psychic phenomena" (qtd. in Story 2001, 252). Thus he tried to "explain" one unknown by invoking another!

Today, UFOlogists such as Peter B. Davenport, director of the National UFO Reporting Center (NUFORC), believe that the great number of unidentifieds indicate at least something momentous is behind them. Given "impressive quantities of principally eyewitness data," says Davenport, while most eyewitness descriptions are of poor quality, "many of the high-quality sighting reports involve certain objective aspects, which, to an open-minded bystander, are quite impressive." He adds, "Strong evidence suggests that we are dealing with a phenomenon that is being caused by palpable solid objects whose characteristics are not of human design, and whose behavior is suggestive of intelligent control" (qtd. in Story 2001, 150). He is, of course, hinting at extraterrestrials—albeit coyly—while the "objects" remain unidentified.

Another who cites the unexplained nature of UFOs is Richard Hall, a UFO advocate associated with such groups as MUFON and CUFOS. He emphasizes, "Among the hundreds of so-called 'UFO reports' each year, a

sizeable fraction of those clearly observed by reputable witnesses remain unexplained—and difficult to explain in conventional terms." He believes that "Collectively, these cases constitute a genuine scientific mystery, badly in need of well-supported, systematic investigation." Again he says, "The circumstantial—and sometimes physical—evidence indicates that something real is going on for which no satisfactory explanation currently exists."

Hall believes that mistaken observations of terrestrial objects as well as "hoaxes/imagination" are to be rejected as explanations because both are "inapplicable to the hard-core unexplained cases." He prefers instead the possibility of "so-called 'nuts and bolts' visitors from elsewhere" (qtd. in Story 2001, 239).

Even vacillating UFOlogist/folklorist Thomas E. Bullard (2010, 311) suggests—at least tentatively:

> Investigators of current and historical UFO reports have sifted out cases with sufficient credible evidence to qualify as defensible. These cases suggest that the character of UFO narratives depends in some part on the character of UFO events, and those events owe their character to a source independent of UFO mythology. . . . Even allowing for human fallibility and self-deception, a genuine mystery seems to be left over.

Bullard is clearly relying on the process-of-elimination method that is the basis of negative evidence.

Then there is Stanton T. Friedman, who promotes the notion of extraterrestrial visitation with bluster, smoke screens, and ballyhoo. He rationalizes, "I learned early on that absence of evidence is not the same as evidence for absence." True enough, but then he is still left with absence of evidence. Friedman, a onetime self-described "itinerant nuclear physicist" was fooled by the amateurishly forged "MJ-12 documents" that purported to prove the U.S. government had retrieved a crashed saucer and its humanoid occupants—proof, Friedman believes, that positive evidence has been covered up by a high-level conspiracy (Friedman 1996, 8, 13, 209–219; Nickell with Fischer 1992, 81–105).

Conclusion

The problem with all such grandiose extrapolation from the data is that it lacks positive evidence. No actual flying saucer or extraterrestrial pilot has ever been captured—notwithstanding hoaxes, folktales, and conspiracy claims. There are only eyewitness reports, photos, ground traces, and the like—all of something unidentified.

But don't all those unidentifieds count for something? Well, quantity is not quality. As extensive evidence shows, cases once touted as *unexplained* were only that; they were not *unexplainable*, and, as a matter of fact, many of them have since succumbed to investigation. Not one proved to be anything other than a natural or manmade phenomenon—not such classic cases, for example, as Roswell, Rendlesham Forest, Flatwoods, Kecksburg, Exeter, Phoenix, and Stephenville (Nickell and McGaha 2012; McGaha and Nickell 2011, 2015). Some cases may never be explained because of original eyewitness error, falsified evidence, lack of essential information, or other flaws. For similar reasons some murders remain unsolved, yet we do not consider those cases evidence of a homicide gremlin.

Nothing said so far means we should not continue to investigate unexplained phenomena, including UFOs. After all, onetime skepticism of fiery stones falling from the skies ultimately gave way to proof of meteorites. Science has nothing to fear from the examination of UFO reports, which, to date, have not been useless after all: We have learned much about illusions and misperceptions and fantasy, about personality traits, about rare phenomena such as ball lightning, about the propensity of immature persons to perpetrate hoaxes (skeptics included!), and much more. But investigation must go beyond just collecting negative evidence. It must represent a real attempt to solve—that is, to explain—a mystery. ■

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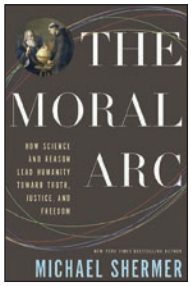
Joe Nickell, PhD, is CSI's senior research fellow. A former private detective, stage magician, and scholar, he is author of many investigative books, including *Crime Science* (with John Fischer) and *Unsolved History*.

James McGaha, Major, USAF retired, is a former special operations and electronic warfare pilot who is now also an astronomer and director of Grasslands Observatory at Tucson, Arizona.

A Protopian View of Moral Progress

DANIEL GRASSAM



The Moral Arc: How Science and Reason Lead Humanity Toward Truth, Justice, and Freedom. By Michael Shermer. Henry Holt and Company, 2015. ISBN 9780805096910. 541 pp. Hardcover, $32.00.

Religion has often positioned itself as the originator (and for some the sole provider) of morality. In *The Moral Arc*, Michael Shermer argues that "most of the moral development of the past several centuries has been the result of secular not religious forces" and that it is science and reason that bend the moral arc toward justice, truth, and freedom. For the few who don't know Michael Shermer, he is the founding publisher of *Skeptic* magazine and the writer of a number of successful books, including *Why People Believe Weird Things*. For those wondering what the moral arc is, the book's first section, "The Moral Arc Explained," covers it. In brief, the moral arc is a metaphor Shermer borrowed from a nineteenth-century abolitionist preacher named Theodore Parker that "symbolizes what may be the most important and least appreciated trend in human history—moral progress."

What has been driving moral progress is explained by another metaphor: the expanding moral sphere. Shermer prefers the three-dimensional sphere over the original expanding circle first used in 1869. (We may think of ourselves as morally progressive, but Irish historian William Edward Hartpole Lecky, who first used the expanding circle metaphor, wrote about including animals in our moral circle almost 150 years ago.) Why is our moral sphere expanding? Shermer ascribes that to "our expanding intelligence and abstract reasoning ability," which gives us the ability to change our point of view and to see and feel the perspectives of others: other races, other sexes, other sexual orientations, and other species.

Why is our moral sphere expanding? Shermer ascribes that to "our expanding intelligence and abstract reasoning ability," which gives us the ability to change our point of view and to see and feel the perspectives of others: other races, other sexes, other sexual orientations, and other species.

The exchange of perspectives gives rise to the application of the moral arc, the results of which is the subject of the book's second section. Here Shermer gives a thorough account of the abolition of slavery, the rise of women's rights, the progress of the gay rights movement, and the current state of animal rights. A lot of research went into this section (each chapter's endnotes contain more than fifty references) and the quality of the narrative matches the quantity of the data, giving ample opportunity to exchange perspectives and maybe expand one's own moral sphere. It may sound odd to describe chapters that discuss so much tragedy, pain, and suffering as enjoyable, but they are. This may be because they are stories of triumph, at least for three of the four subjects. The chapter on animal rights may have you rethinking that steak dinner and questioning the justifiability of animal testing.

"In a book on moral progress, it is necessary to address its obvious antithesis—moral regress—and identify which pathways lead to evil, to mitigate them." This is the topic of the third and final section, where Shermer considers the psychology of immorality using the "arguably no more poignant example than that of the Nazis." Shermer seeks to understand how an otherwise "intelligent, learned, highly cultured people" could commit such atrocities. This investigation leads to questions of moral culpability. In a deterministic world, can you hold people accountable for

their actions? Throughout the book Shermer argues for the importance of continuous thinking over categorical thinking, spectrums not pairs. In this instance he suggests that we think about "degrees of freedom," a scale with insects on one end having very little freedom and humans on the other possessing the most. Even within our species there is a range where some people—"psychopaths, the brain-damaged, the severely depressed, or the chemically addicted—have fewer degrees of freedom." With this understanding the question turns to what do to with this knowledge and how to apply it in our justice systems. Is the goal of our justice system to mete out punishment or lower recidivism? What works best? A retributive, punishment-based justice system or a restorative one? Shermer demonstrates with studies and explains through anecdotes how restorative justice, where the perpetrator "apologizes for the crime; attempts to set to rights the situation; and, ideally, initiates or restores good relations with the victim," can work.

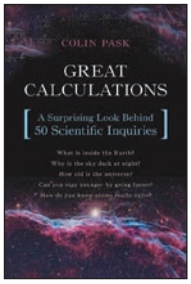
Shermer describes *The Moral Arc* as a "protopian work."

Shermer describes *The Moral Arc* as a "protopian work," a phrase meant to distinguish it from the unrealistic ideal of utopia, a static place where everything is perfect. Protopia is about making steady and continuous incremental improvement, to "try to make the world a slightly better place tomorrow than yesterday." Shermer is optimistic; after reading *The Moral Arc* you may be too. ■

Daniel Grassam writes from his home in Auckland, New Zealand.

Unlocking the Treasures

DAVID KORDAHL



Great Calculations: A Surprising Look Behind 50 Scientific Inquiries. By Colin Pask. Amherst, NY: Prometheus Books, 2015. ISBN 1633880281. 414 pp. Softcover, $18.00.

Back when I taught high school physics, I'd lug those giant Stephen Hawking anthologies down from the shelf a few times every year. During the gravity unit, for instance, I'd select *On the Shoulders of Giants*, all 1,264 pages, and pass it around so students could appreciate its impressive heft. Most of them would hand it off uninterested, but the interested few would flip through its pages. These anthologies, after all, presented history's geniuses (*On the Shoulders of Giants* collects Copernicus, Galilei, Kepler, Newton, and Einstein) with minimal intros by Hawking—another genius. Those brave students who borrowed such books would return them reverently, impressed by all they didn't know and having learned almost nothing at all.

The longer I worked as a teacher, the less eager I was to recommend Hawking's anthologies. At a certain point, I realized that these books—however unwittingly—encouraged two big misperceptions: first, that science is the story of a few lone geniuses; second, that science is usually too opaque to understand. Of course, the first of these failings isn't really the books' fault (any finite "history" requires a culling of the herd), but the second still seems unforgivable. In the era of Rap Genius, surely the science greats deserve some lucid annotation.

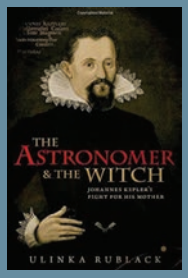
In their failures, the Hawking anthologies suggest the possibility of a better version. What if another book could guide us, with a balance of economy and detail, through pivotal results in the history of science with explanations that would dig beyond the usual summaries, down to the calculations themselves? What if the book combined a Wikipedian breadth with a professorial authority, and what if it had an attitude not of bringing the geniuses down to us, but of bringing us up to them? And oh yeah—what if the book were genuinely fun to read?

You've probably beaten me to the punch: Colin Pask has written that book. *Great Calculations* is an idiosyncratic skeleton key to science history, and it has the makings of a minor classic. "The calculations described in this book," Pask writes in the preface, "are mostly relatively simple (at least in principle, if not always in practice) but still of major significance."

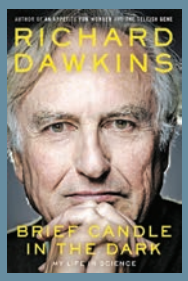
From a distance, there's nothing too unusual here. Pask is an emeritus math professor and the author of two previous books—an overview of mathematical thinking (*Math for the Frightened*) and an exploration of Newton's work (*Magnif-*

[NEW AND NOTABLE

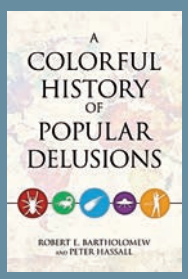
Listing does not preclude future review.



THE ASTRONOMER AND THE WITCH: Johannes Kepler's Fight for his Mother. Ulinka Rublack. Astronomer Johannes Kepler was a key figure in the scientific revolution, defending the Copernican view of a sun-centered universe. However, his role in defending those accused of witchcraft is far less well known. In 1615, when Kepler was at the height of his career, his mother Katharina was accused of witchcraft. The trial lasted six years, and Kepler conducted his mother's defense. In *The Astronomer and the Witch*, Ulinka Rublack discusses this episode in Kepler's life and how it offers a fascinating glimpse into his worldview. While providing rational explanations for phenomena that his mother's accusers attributed to witchcraft—for example, Rublack notes that Katharina Kepler had accidentally brought suspicion on herself by asking for her fathers's skull, since "Skulls ranked among the legally recognized means of sorcery and could render anyone dealing with them under suspicion of being a witch"—Kepler did not question the existence of magic or witchcraft; in fact, he believed in them. And Kepler was hardly alone; as Brian Levack notes in his book *The Witch-Hunt in Early Modern Europe*, "In the context of witchcraft the word 'skepticism' usually denotes the attitudes of those who doubt or deny the existence of witches or the possibility of their crime. Judicial skeptics did not necessarily adopt such a stance. . . . Judicial skepticism could, and in most cases did, coexist with a firm belief in the reality and possibility of the crime" (p. 254). *The Astronomer and the Witch* is a fascinating blend of science biography and examination of witchcraft beliefs and persecutions. Oxford University Press, 2015, 272 pp, $29.95.



BRIEF CANDLE IN THE DARK: My Life in Science. Richard Dawkins. Zoologist and evolutionary biologist Dawkins burst onto the cultural scene with his *Selfish Gene* in 1976 and other memorable books, including *River Out of Eden*, *Climbing Mount Improbable*, *Unweaving the Rainbow*, and his 2006 bestseller *The God Delusion*. *Brief Candle in the Dark* is his typically lively, engaging, and thought-provoking autobiographical look at his life as a scientist and at times controversial public figure. Filled with insights, stories, and anecdotes about his life, his friends and intellectual colleagues, his courses, his enthusiasms, his lectures, debates, television appearances, and books (he gives the publishing backstories plus substantive summaries of all twelve), *Brief Candle in the Dark* displays all the intelligence, insight, clear-thinking, literary quality, and at times provocative observations we have come to expect from Dawkins. Highly recommended. Ecco/HarperCollins, 2015, 416 pp., $27.99.



A COLORFUL HISTORY OF POPULAR DELUSIONS. Robert E. Bartholomew and Peter Hassall. Two social historians write an entertaining survey of stories to serve as a guide to recognizing and understanding the dynamics of collective obsessions and follies, what the nineteenth century Scottish journalist Charles Mackay called "popular delusions." Along the way they create a typology of such behaviors in two broad categories: social panics and enthusiasms. The twelve main chapter subjects indicate the typology: rumors, fads, crazes, manias, urban

icent Principia). In its organization, *Great Calculations* has a pedagogue's pragmatism and clarity with topical chapters that each move forward in chronological arcs. After an introduction, the book has two chapters on pure math, one on earth science, three on astronomy, one on biology, three on physics, one on dynamical models, and a final chapter to discuss how these particular fifty calculations were picked. Parenthetical references to the extensive bibliography are scattered liberally throughout.

What's unusual is how well Pask contextualizes his material. When Pask discusses the Fibonacci sequence, we're told how Fibonacci—or Leonardo Pisano, Family Bonaci, as he was known—wrote *Liber Abbacci*, a book whose main purpose was to teach readers how to use Arabic numerals. Much of *Liber Abbacci* was solidly practical (Chapter 9: "On the Barter of Merchandise and Similar Things"), but on one page Leonardo posed the question history would remember him for: "How many pairs of rabbits are created by one pair in one year?"

Most of us know how that one goes. Just add up the last two entries, starting with 1 pair, then 1+1 =2 the next month, then 2+1=3 the next . . . up to 377 bunny pairs, one year in. And while it's simply interesting to see where such a calculation originated, one of the book's great pleasures is its casual tracking of how the continued study of a basic issue (population dynamics) can lead to increasingly diverse investigations (exponential growth, actuarial tables, chaos theory).

The inclusion of books such as *Liber Abbacci* in *Great Calculations* might be taken to imply that progress in math is identical to progress in science. There's some truth to this. Pask has a great respect for mathematicians such as John Napier, inventor of the logarithm, who managed to speed scientific progress. (Pask quotes Laplace, who wrote that logarithms, "by shortening the labors, doubled the life of astronomers.") But Pask is careful not to conflate math and science exactly, and some of the results he includes are as mathematically trivial as they are physically profound.

The most extreme example of this—a calculation that Pask includes in his all-time top-ten—is the simple calculation with which William Harvey established the circulation of blood. The accepted theory of blood flow, passed down from Galen, asserted there were two different types of blood—one from the lungs that traveled through the arteries, and another from the liver that traveled through the veins. Capillaries, the linkages between arteries and veins, were too small to be observed, so it was assumed that blood was consumed at the parts of the body wherever it was sent. To contradict this, Harvey calculated the volume of blood that the

human heart pumped in a half-hour—more blood, it turned out, than the whole human body could hold. Even readers steeped in old theory found this absurd. The simple calculation cast a shadow on old notions, and Harvey's new ideas about circulation were accepted widely in his own lifetime.

Pask doesn't reveal his criteria for calling a calculation "great" until the last chapter. By then, I was curious. Pask always tells us his reasons for being impressed, but with only fifty calculations, why these? Ptolemy's Almagest, for instance, is hailed not only as an early, successful mathematical model of the planets but also as "the first mass-produced mathematical table." That seems fair. But some inclusions are puzzling. Why is Lord Kelvin's 1862 calculation of the age of the Earth included? By Kelvin's estimate, Earth was 20–400 million years old—a number that's a way off from our current estimate of 4.5 billion years, to say the least.

Pask's greatness criteria are fivefold. His great calculations are so chosen because they a) marked a breakthrough, b) revealed something unexpected, c) were mathematically innovative, d) were "heroic" (i.e., tough to complete), or e) had a major social and/or intellectual impact.

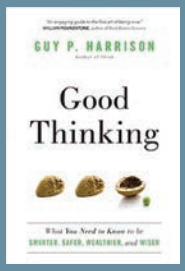
Each of the calculations discussed in this book fits at least two of these criteria. Kelvin's estimate for the age of the Earth, then, is a "great calculation" not because it's *correct* but because it fits criteria a* (the asterisk, Pask explains, is to indicate "an extreme case"), b, c, and e.

Admittedly, I'm not convinced that this tabulation has made the chosen fifty any more fair and balanced than had Pask just titled the book *Some Favorite Calculations* and dropped the front. It seems that Pask, too, has worried about this. A few chapters end with apologetic subheads (e.g., "WHAT IS LEFT OUT") under which lie charming sketches of the runners up. Even when a calculation's pantheon position is secure, one can still see Pask's thumbprints on the pedestal. For example, calculation 35, "photons exist," is in fact a one-two punch from Planck and Einstein, but in Pask's telling, Einstein takes the foreground. To me, this looks like the decision of a smart writer, not a fair judge. Pask knows just how many pages Plank would require.

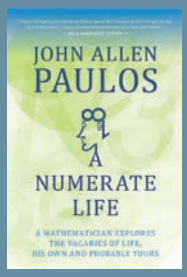
But if such artful elisions make this something less than a reference anthology, that's also the charm. *Great Calculations* is a mathematical mixtape filled with a career's worth of carefully curated showstoppers. The book deserves to be read by fans of science everywhere.

David Kordahl has written for the *Los Angeles Review of Books*, *Nautilus*, and *Motherboard*. After earning an MS in physics, he taught science at Mesa High School for four years. He is now working toward a physics doctorate at Arizona State University.

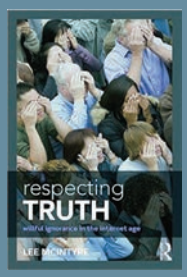
legends, stampedes and panics, classical mass hysterias, anxiety hysteria, immediate community threats, moral panics, riots, and small group panics. Prometheus Books, 2015, 352 pp., $19.00.



GOOD THINKING: What You Need to Know to be Smarter, Safer, Wealthier, and Wiser. Guy P. Harrison. Award-winning journalist Guy Harrison has done it again. Author of such laudatory works as *Think: Why You Should Question Everything*, *50 Popular Beliefs That People Think Are True*, *50 Simple Questions for Every Christian*, and *Race and Reality*, Harrison presents another lively guide based on the view that skepticism is the essential posture for the twenty-first-century human being and critical thinking the indispensable skill for living in modern society. He raises questions about thinking and takes readers on an expedition into the brain, the pitfalls of human memory, our implicit biases, and the battle of good thinking vs. conspiracy theories. Prometheus Books, 2015, 290 pp., $17.00.



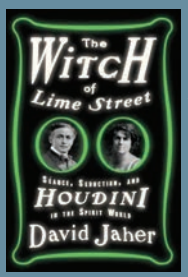
A NUMERATE LIFE: A Mathematician Explores the Vagaries of Life, His Own and Probably Yours. John Allen Paulos. Mathematics professor and author John Allen Paulos popularized the word *innumeracy* for our lack of numerate thinking and strangely cheerful acceptance of mathematical ignorance. Here he presents a "meta-memoir," or even "anti-memoir," combining personal memories and mathematical approaches to re-evaluating them. The book is filled with entertaining vignettes to illuminate still more about how mathematical thinking provides new perspective on human habits and peculiarities. A commentary on life, his and yours. Prometheus Books, 2015, 200 pp., $17.00.



RESPECTING TRUTH: Willful Ignorance in the Internet Age. Lee McIntyre. McIntyre is a research fellow at the Center for the Philosophy and History of Science at Boston University and author of the 2006 book *Dark Ages*, which argued that ideology was corrupting the standards for evidence-based belief in the social sciences. Now he finds science itself (the natural sciences this time) under attack by people (from diverse political viewpoints) who routinely question, resist, deny, ridicule, reject, and outright disrespect findings of science they find inconvenient. In this short book, McIntyre explores this "willful ignorance," a pervasive hostility to the concept of science-based truth in the first place. As he says, the problem isn't mere ignorance of the truth; it is the "willfulness" that is troubling. He thinks most people, deep down, know that we cannot do without science. He wants to reach those who "may wish to row away from science and reason when it is convenient but . . . also want to keep the shoreline in sight." Routledge, 2015, 150 pp., $29.95.

SEEKING BIGFOOT. Michael Newton. Newton is a prolific writer with nearly 300 books to his name, including several on cryptozoology, and his disdain for skeptics is a recurring theme in his work. In his latest book Newton briskly touches on a handful of Bigfoot-re-

lated topics, including tracks, hoaxes, and sightings—though oddly the 1967 Patterson/Gimlin film that has for decades been touted as the gold standard for evidence barely merits a mention. Unfortunately, *Seeking Bigfoot* pads out its 190 pages with tangential sections and chapters such as lists of monster-related movies, TV shows, Facebook pages, YouTube clips, Bigfoot enthusiast groups, and websites. Newton's research seems to have been mostly done online, which is evident in his URL-heavy reference and citation list. This is not inherently problematic, but Google searches are usually poor at finding original resources and content. Furthermore, instead of doing original research and bringing new information to light on Bigfoot or other cryptids that may be locked away in old newspapers, journal articles, or printed books, most of the information Newton presents can be easily found online by anyone with an Internet connection. Newton adds more filler by listing biographies of dozens of Bigfoot hunters (most of them friends of his, with skeptics conspicuously absent) and state-by-state mentions of reports culled largely from the notorious Bigfoot Field Researcher's Organization. In a section likely to embarrass Newton for years to come, he endorses Melba Ketchum's thoroughly discredited (and self-published) "Bigfoot DNA" results from 2013. As commentary, Newton quotes an apparently anonymous "Internet blogger who calls him- or herself 'idoubtit,' writing for a website titled 'Doubtful News.'" It's not clear whether Newton's facility with Google failed him or his apparent aversion to quoting knowledgeable skeptics prevented him from identifying "idoubtit," but the unnamed "skofftic" Newton quoted is Sharon Hill, who is in fact prominently identified as "idoubtit" on the Doubtful News site. Newton rounds out the section with a mystery-mongering mention of DNA "Yeti" results claimed to have come from an extinct polar bear; sadly for Newton, that too has already been debunked (see "No Reason to Believe That Sykes's Yeti-Bear Cryptid Exists" special report in the July/August 2015 SKEPTICAL INQUIRER). Skeptics—as well as less-than-skeptical but knowledgeable Bigfoot researchers—can cringe (or laugh) at Newton's factual errors and straw man arguments, but even casual readers are likely to be disappointed by the laundry-list, superficial treatment of Bigfoot information found in *Seeking Bigfoot*. Newton's cursory research and dependence on Internet-culled lists to fill this book is understandable given the pace at which he publishes (about eight books a year according to his website), but Bigfoot—and cryptozoology—deserve better. Schiffer Publishing, 2015, 190 pp, $24.95.

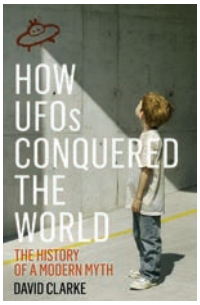


THE WITCH OF LIME STREET: Séance, Seduction, and Houdini in the Spirit World. David Jaher. Spiritualism was in vogue in the 1920s, and Sir Arthur Conan Doyle promoted the mediumistic powers of Mina Crandon, the wife of a surgeon and rising star of spiritualism who became better known as Margery ("the witch of Lime Street"). A *Scientific American* committee couldn't debunk her, but one of the five members, magician Harry Houdini, took Margery on as a personal challenge. This is a narrative account of that time and that endeavor where the spirit world and Houdini's skills, reason, and rationality came into strong conflict. Crown, 2015, 420 pp., $28.00.

—Kendrick Frazier and Benjamin Radford

On Her Majesty's Secret Saucers

ROBERT SHEAFFER



How UFOs Conquered the World: The History of a Modern Myth. **By David Clarke.** Aurum Press, Ltd., London, 2015. 312 pp. $28.99.

One of the most profound observations ever made about UFOs was that of the late British Fortean author Hilary Evans in his essay "A Twentieth Century Myth": "No anomalous phenomenon has generated so rich an anomaly-cluster as the flying saucer. Kenneth Arnold's straightforward, uncomplicated sighting" was gradually embedded in "a sprawling aggregate of associated happenings"—cattle mutilations, crop circles, black helicopters, Men in Black, saucer crashes and saucer bases, contactees, abductees, etc.—"constituting a wonderfully rich and elaborate mythology unmatched in the world's folklore."

This is, I'm sure, what Clarke means when he says that UFOs "Conquered the World," and in this book he sets out to understand why. Clarke explains this using another quote from Evans: "Hilary Evans said that most of us have never known a time when there was no such thing as a UFO. 'Yet there was such a time,' he wrote. 'UFOs are a creation of our time, and when their time came, they were born.'"

Clarke teaches journalism and media law at Sheffield Hallam University in the United Kingdom and writes a monthly column for *Fortean Times* magazine. (British Forteans, for whatever reason, tend to be much more skeptical than their American counterparts.) And unlike *some* writers who dabble in folklore and UFOs, Clarke understands that when stories parallel folklore, it suggests they are *fiction* not truth. "Folklorists categorize invented or false stories as examples of what they call 'ostension,' whereby people either spontaneously or deliberately create new stories and events that reproduce existing lore and legends." He presents a detailed argument showing how pre-1947 science-fiction stories already contained most of the significant themes later turning up as "actual" UFO claims:

> Ockham's razor suggests that aliens are not monsters from the Id, or expressions of a collective unconscious, let alone travellers from another world. They are products of our imagination and the science fiction that has been clogging our brains for more than a century.

The book begins largely autobiographically, describing Clarke's own infatuation with UFOs as a youth growing up in the 1970s. As a teenager he began investigating local UFO sightings and saw problems in the narratives that others overlooked. "During the encounters that followed my doubts grew and my naïve faith was challenged to the breaking point." He was surprised to find that UFOlogists, including some well-known ones, instead of welcoming prosaic explanations for sightings, resisted them. One supposed UFO witness told Clarke, when presented with a logical explanation, "Look, you can't take this sighting away from me!"

Clarke launches into an overview history of UFOs, not surprisingly concentrating on the British perspective. Much of this information is not available elsewhere for readers in the United States. He shows how observers at the famous UFO "hotspot" at Warminster were easily fooled by simple hoax balloons launched from a nearby hill and how when this was revealed in a BBC television program the UFO spotters refused to accept the explanation.

When the British Ministry of Defence (MOD) began releasing some UFO-related documents in 1998, Clarke was among the first to pore over them. He was surprised to find how little substance they contained. When the United Kingdom passed a freedom of information act in 2005, Clarke began requesting UFO-related documents from the Ministry of Defence. In 2007, the MOD began a mass-release of records from its UFO desk.

> The time I had invested researching the older files and my contacts with the UFO desk staff made me the obvious curator for the collection. It was quite a turnaround. After a decade acting as a poacher I suddenly found myself playing the role of a gamekeeper. From 2008 I began working with the staff at Kew to prepare ten separate tranches of documents for release. A total of 227 files and more than 52,000 pages were eventually scanned and uploaded to the National Archives web site where they can be downloaded by anyone.

This has, perhaps inevitably, brought Clarke into a long-standing feud with Nick Pope, who has made a twenty-year career as a big-name UFOlogist out of having worked on the MOD UFO desk for three years during the early 1990s. But believers in UFO conspiracies refused to accept that there are no secret, bombshell UFO files hidden away. "The UFO Truthers, as I now call them, refuse to believe anything unless it has first been denied."

Clarke gives us an interesting history of British UFO contactees, especially George King, who claimed to be in contact with a space god called Master Aetherius. Noting that seventeen years after his death King had been deified as a "cosmic avatar" by the leader of the church he founded, Clarke remarked, "I could not see why those who claim that flying saucers bring messages from the gods should be regarded as any less genuinely held, or unbelievable, than the tenets of any other religion." He then presents a discussion of UFOs in the context of religion, finding many similarities.

I spotted a few minor errors, most probably owing to the still-significant gulf between American and British UFOlogy (for example, he places the media frenzy over fabulist Bob Lazar's Area 51 claims in Los Angeles instead of Las Vegas)—and I will overlook his comment that CSICOP/CSI is a "notorious sceptical organization."

Clarke, like most British Forteans, opts for the "psychosocial hypothesis" (PSH) to explain UFOs and most other Fortean phenomena. He illustrates it with a quote from the British journalist Bryan Appleyard saying that the PSH explains UFOs as "products of our minds: projections of our anxieties or aspirations, culturally determined fantasies or hallucinations or new religions in the process of emerging from the ashes of the old." Clarke contrasts this with "debunking of the type associated with Richard Dawkins," because the PSH sees the social phenomenon of UFOs "as interesting and worthy of serious study." I don't recall any UFO skeptic suggesting that they are not.

Clarke gives us an interesting history of British UFO contactees, especially George King, who claimed to be in contact with a space god called Master Aetherius.

Given that the PSH sees UFOs as "fantasies or hallucinations" that are "products of our minds," the difference between the two approaches (PSH and "debunking") would seem to be largely semantic. The PSH seems to amount to a polite and respectful way of saying "it's all in your mind," suggesting that there are good reasons for that being the case.

However, none of this detracts significantly from the importance of the book; it is the best book on UFOs to appear in a long time, and I encourage everyone interested in the subject to read it. ■

Robert Sheaffer's "Psychic Vibrations" column has appeared in the Skeptical Inquirer for nearly forty years; its highlights have been published as a book (Create Space, 2011). Sheaffer blogs at www.BadUFOs.com, and his website is www.debunker.com.

Memoir of an Accused Satanist

MIKE MORAN

Life After Death. By Damien Echols. New York: Penguin Group, 2013. ISBN 978-0142180280. 416 pp. Softcover, $11.88.

When it comes to true-crime autobiographies, readers can usually expect one or both of the following items within the pages: a guilty-pleasure of tabloid sensationalism surrounding a real tragic event or a commentary on the social factors leading up to the crime and punishment with the writer claiming innocence (or not). With Damien Echols's *Life After Death*, I was hoping for my guilty-pleasure fix in the form of the small-town murder mystery of which he was convicted, as well as an opinionated commentary on the American Satanic Panic of the 1980s and early 1990s that many believe Echols to have been a victim of. To my surprise, and ultimate delight, *Life After Death* offers neither true-crime cliché en masse but instead transcends the genre with what may be the best true-crime autobiography ever written. Shunning the conventional formats, Echols drifts seamlessly through vibrant childhood memories, terrifying prison experiences, and poetic outpourings from a thoughtful young man who has had many lonely years to contemplate his own existence. Though we of the skeptical community may be initially a little turned off by Damian's fervent endorsements of various religions and pseudoscience (which he piles under the repeated term *magick*), he speaks of these things with such eloquence and wonder that even us critical-thinking types will accept such ideas as fair game for a young man's soul searching in a desperate situation.

If you're unfamiliar with Echols and the West Memphis Three (WM3) murder conviction, here's a quick rundown: In West Memphis, Arkansas, in 1994, a trio of impoverished teenage Goth kids (Damien Echols, Jason Baldwin, and Jessie Misskelly) were convicted of the murder of three younger boys (Steve Branch, Michael Moore, and Christopher Byers) in an alleged Satanic ritual. The shaky evidence, the seemingly prejudiced public opinion of the Bible Belt town, and the absurdity of the devil-cult hysteria led to a national outcry of unprecedented proportions. Documentaries were filmed, books published, and a gallery of celebrities, including Pearl Jam's Eddie Vedder, actor Johnny Depp, and Dixie Chick Natalie Maines, got involved in the case. The WM3 were finally released from prison in 2011 on an "Alfred plea" (a deal that allows the defendants to technically plead guilty while publicly maintaining innocence in return for a resentencing), and although theories abound, the identity of the killers remains a mystery.

Echols's elegant yet unpretentious telling of his life story begins with his earliest memories of an impoverished childhood in the deep South, growing up with a dysfunctional and often-transient set of family members. His early living conditions are recounted in disturbing detail, sounding not much better than the prison cells he spent eighteen years in. He describes one abode on page 50 as "an honest-to-God shack . . . no running water or electricity . . . no heat or air conditioner . . . our drinking water came from a well that crop-dusters regularly sprayed with pesticides." He later recalls when his place of residence was upgraded to a room in his grandmother's trailer: "I no longer considered myself poor," he admits at the start of Chapter 7, "I was now in the lap of luxury."

Echols's memoirs of his teenage years will bring readers familiar with the late eighties/early nineties heavy-metal culture back to the days of dubbed cassette tapes, *Thrasher* skateboard magazine, and late-night viewings of MTV's *Headbanger's Ball*. Chapter 8 in *Life After Death* offers his vivid recollection of this era as well as proving that Echols's writing talents extend beyond those concerning the murder accusation. In it, Damian recounts a night of adolescent years "sneaking out" with friend (and future fellow convict) Jason Baldwin to explore their small town after dark. Damian brings the reader along for a "night . . . so cold that everything seemed crystal clear, magikal, and a little scary. . . . The feeling of adventure and absolute freedom was amazing" he recollects on page 106. Recounting the boys' rural explorations in the dead of night, as they terrified themselves with discussions of ghost stories and creepy local rumors, including one where "some kid had claimed to see a dead man hopping back and forth across the train tracks on Halloween night" are reminiscent of Stephen King's incorporations of early teenage memories into his fictional characters. It's unsurprising that Damian later admits to a steady diet of King nov-

els throughout his life. He even adds: "Sometime later I saw the movie *Stand by Me* (based on a King story) and was overcome with nostalgia because of how much it reminded me of us."

Despite intentionally leaving much of the detail of the trial and conviction to the many other sources on the subject, Damien is able to offer alarming commentary on the state of the Arkansas death row system without being too preachy. "The people here are all mentally defective in ways that range from mild retardation to severe schizophrenia," he writes on page 280, reflecting his strongest observational commentary on the prison system; he repeatedly asserts that not most, but all, inmates he's seen put to death suffer from intellectual disabilities.

> I've waited for someone to walk through the door whom I could have a conversation with, but it just doesn't happen. . . . Most not only are culturally illiterate, but also can barely manage to express themselves in English. . . . I've never met a prisoner with a college education and can count the high school graduates on one hand.

The most eloquent of Echols's prose is found in Chapter 17, where he beautifully blends a daily journal entry into an abstract critique of small-town Southern intolerance and blandness and then into a childhood memory of a local urban legend. "In this part of the world, all shrines are built to honor the great spirit of mediocrity," Damien writes on page 209. "This is where the calluses on a man's hands are bigger than his conscious, and dreams are drowned in sweat and tears." The chapter then drifts ethereally into reminiscence of a West Memphis mass panic of Damian's youth where "people were claiming to have seen a man with a dog's head." Echols suggests that this hysteria may have laid the foundation for the Satanic anxieties that later led to his arrest, as he goes on to explain: "A vague atmosphere of dread and dangerous fear seemed to hover like a fog for the next decade." Though we skeptics would want to hear more about the dog-man rumors and Satanic cult hysteria, the writing is so well-done that it leaves little to complain about, for it's not often you find this caliber of prose in the true crime section of Barnes and Noble.

With *Life After Death*, Damien Echols manages to go far beyond the autobiographical, true crime writing as we know it and instead blind-sides the often-predictable genre with a beautifully written account of a unique life. Though we in the critical-thought community may be slightly disappointed with the lack of Satanic cult-hysteria in *Life After Death* (the term "Satanic Panic" isn't used even once), Echols is such a masterful writer that the reader is not only left satisfied but also craving future writings even on subjects outside the world of skepticism. ■

Mike Moran is a Baltimore-based comedian, writer, and musician. He does stand-up comedy all over the Baltimore/D.C. area, as well as improv with the Baltimore Improv Group and cohosts a podcast called *Digression Sessions*, part of the Thunder Grunt Podcast Network. He also writes a regular column for D.C.'s BrightestYoungThings.com titled BYTimore. Mike also plays music with Mike Moran's 100% Original Cover Band. Find him on Twitter @MikeMoranWould.

INBOX]

Skeptical Inquirer
Celebrity Scientists
Scientific Stars Who Shape Our Views of Science
SPECIAL REPORT
Yeti DNA Not a Prehistoric Bear
ADVERLYING: Disliking Advertising from an Informed Perspective
A Skeptic's Near-Death Experience
Do We Really Want to Believe in UFOs?
Scott Joplin's Skeptical Black Opera

Celebrity Scientists

Whether it is Stephen Hawking's guest-starring role on the CBS sitcom *The Big Bang Theory* or Neil deGrasse Tyson's down-to-earth chat with Charlie Rose on *60 Minutes*, there has certainly been a shift in the way scientists reach the masses ("A Brief History of Scientific Celebrity," July/August 2015). As social media amplifies their message, it is only fitting that some of the most brilliant thinkers of our time enjoy a celebrity spotlight that has often been reserved for athletes, actors, and politicians. After all, it is through dialogue and debate of great ideas that they are able to teach us, entertain us, and inspire us to achieve more.

Michael Aaron Gallagher
Syracuse, New York

In the article "A Brief History of Scientific Celebrity," the author Declan Fahy lists eight prominent scientists who he considers to be "The New Celebrity Scientists."

A notable and regrettable exclusion from this list is the English physicist and professor of particle physics, Professor Brian Cox. Cox's engaging yet informative style, the almost inspirational feel of his productions, and the sheer volume of his media work in the area of the public understanding of science, clearly puts him head and shoulders above those in the author's list.

One can only assume that latent Americano-centrism contributed to the glaring admission of Cox from this list.

Dr. Roger Morris
Queensland, Australia

Good grief, folks. How could you have left out E. O. Wilson?

R. W. Loesch
Big Rapids, Michigan

Ah, Celebrity! Ah, Science!

Sir Isaac Newton: "I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the seashore . . . whilst the great ocean of truth lay all undiscovered before me."

Fame is fickle, and oh, so fleeting! For instance: Crick and Watson (Watson-Crick as their model is identified) starred; Maurice Wilkins tagged along

carrying the DNA studies; while Rosalind Franklin never had a chance.

July 25, 2015, was the ninety-fifth anniversary of Rosalind Franklin's birthday. Although she died before the awarding of the Nobel Prize in 1962, she merits wider recognition—if not celebrity—for her cogent contribution to the structure of the Watson-Crick model.

Clark J. Nichols
Henniker, New Hampshire

Declan Fahy responds:

I thank readers for their thoughtful responses. I would just note that my book The New Celebrity Scientists*, from which I drew my SI article, aims to analyze the nature and impact of modern scientific celebrity in a broad sense, and I selected the eight core scientists to illuminate vividly the core dimensions of scientific fame. In response to Morris's letter, I note that the last few pages of my book focus on Brian Cox, "as a newer iteration of the celebrity scientist, as he was a (minor) star in the music world before becoming a major star in the scientific world."*

Being a Good 'UFO' Observer

Klaus Brasch's article on flying saucers in the latest Skeptical Inquirer ("Do We Really Want to Believe in UFOs?" July/August 2015) hit a responsive chord with me. Many, many years ago a family friend gave me a copy of Adamski and Leslie's *Flying Saucers Have Landed* for my fourteenth birthday, thinking, no doubt, comic relief. I found it quite entertaining and, yes, my BS detection alarm did keep going off. At the time (and still), I was a dyed-in-the-wool amateur astronomer and in all my time under the stars I never saw anything unusual or unexplainable. Leslie's chapter (Book 1) was largely a bunch of sightings/case histories. They were interesting, but almost all of them were quite hard to swallow.

I was living at the time in Manhattan Beach, just south of Los Angeles International Airport (LAX). One morning, on my way to school, on a very unusual bright sunny day, I saw it. A brilliant cigar-shaped object hanging straight ahead of me! Recalling some of Leslie's descriptions, I pulled over and stopped cold. Thought one: turn around and get home as fast as possible, grab binoculars, cameras, and telescope, and get back to watch the show. Bad idea. Thought two: how about running the block back to a store, phone my folks, and have them bring my stuff here ASAP. I decided to just sit and watch the show. The object was almost blindingly bright, and height to length was like a cigar, definitely not a blimp. As I watched, the object seemed to drift slowly to the north, then began fluctuating in brightness, sort of a flicker effect, then it went out. There was still something there, now moving somewhat faster to the north. Well, somewhat disappointing, nothing more than a common airplane! It was very unusual to have a bright sunny morning; usually there were the ever-present low clouds. The sun-object-me angle was just right to get a brilliant glint off the plane's wings, and since it was heading for LAX it was coming almost straight at me, explaining the very slow transverse speed. It seemed the show went on for many minutes, but since I made it to my class on time, the whole thing wasn't more than maybe five minutes, tops.

Being terminally smitten amateur astronomers, several of us would make many trips to local world-class observatories including, of course, Palomar. On one of those trips, we stopped at Palomar Gardens Tavern for lunch and had a very interesting and entertaining talk with George Adamski himself. Very, very entertaining to say the least, and yes our BS detectors did work overtime. George was kind enough to sign my copy of *Flying Saucers*, which amazingly enough I still have. All in all a *very* entertaining lunch!

I have seen other strange sights over the years, all of which ended up having a very ordinary, prosaic explanation: weather balloons, unusual planet configurations, bright fireballs, and the like. I think the take home from all of this is that one must make and document as carefully and as accurately as possible observations. One should know what observations would be relevant and how to make and record them. Know how to estimate angular size and rate of motion on the sky, e.g., my fist at arms length is about 6 degrees. I'd submit that doing this would take much, if not all, of the mystery out of such sightings.

Again, loved the article.

F. Jack Eastman
fjackeastman@gmail.com

Scott Joplin's *Treemonisha*

Skepticism covers a lot of ground!

With great pleasure (and a bit of surprise) I read Bruce A. Thyer's excellent article on Scott Joplin's *Treemonisha* in your July/August issue.

Since I bought the double-CD in a lavishly equipped edition (hardcover illustrated book with 100+ pages) four years ago (through the Paragon Ragtime Orchestra online), I have heard the work several times, but never heard *about* it. Before now. My hope is great that it might reach a wider circulation—better late than never.

And let me put in a small correction to Thyer's text: *The Sting's* signature-tune was not "Maple Leaf Rag," but the equally beautiful and listenable "The Entertainer." Go listen to Joplin—and get wise!

Frits Schjøtt
Svendborg, Denmark

Adverlying

It is not often that I disagree entirely with an article in SI, but I must do so now. Steve Cuno ("Adverlying: Disliking Advertising from an Informed Perspective," July/August 2015) flogs dead horses such as mind-control and subliminal advertising and ignores the real evil. The vast majority of ads are not informative or for new products. They are only for market share in saturated markets. They are a way of competing that is of absolutely no benefit to the consumer. The outrageous sums paid for Super Bowl ads are nothing compared to the costs of price reductions or quality improvements. No one is ever going to buy a new car because of an ad, but he might be persuaded to buy a Lexus instead of a Cadillac. That is the real function of advertising. Cuno ignores that fact entirely.

You can protect yourself against puffery and lying—these things are expected—but there is nothing you can do about the lack of real customer concern and the blow against honest competition that is the only thing that makes capitalism function.

George Cunha
San Rafael, California

In response to Steve Cuno's oily, feeble defense of advertising in his article, "Adverlying," I would like to point readers toward Paul Baran and Paul Sweezy's *Monopoly Capital*, cited in an article by Hannah Holleman et al. in *The Monthly Review* of April 2009 (page 17). "The *greatest* damage done by advertising," Baran and Sweezy wrote,

> . . . is precisely that it incessantly demonstrates the prostitution of men and women who lend their intellects, their voices, their artistic skills to purposes in which they themselves do not believe, and that it teaches "the essential meaninglessness of all creations of the mind: words, images, and ideas." The real danger from advertising is that it helps to shatter and ultimately destroy our most precious non-material possessions:

the confidence in the existence of meaningful purposes of human activity and the respect for the integrity of man.

Moreover, to satisfy the needs of advertising, some of the brightest and most talented minds in our nation devote their lives to the task of convincing people to purchase a particular beer or pain reliever; this is an irrational use of human talent in a world where the need for it is immense.

In short, the sales effort is a deeply dubious enterprise that inflicts great damage upon our societies. "The trouble," Baran and Sweezy observed nearly fifty years ago, "is that advertising of necessity promotes conformity to norms that, by any rational standard, are worthless or humanly destructive."

Louis S. Bedrock
Roselle, New Jersey

Steve Cuno responds:

Mr. Cunha asserts that advertising increases prices, a myth that merits a detailed follow-up article to expose the folly of the argument. The fact of the matter is that by helping effect economies of scale, successful advertising can actually drive pricing downward—particularly when companies compete for customers—and rarely if ever drives it upward.

Like it or not, companies advertise to generate sales, grow market share, increase revenues, fatten the bottom line, boost market cap, and provide a return to shareowners. That's a concept fundamental to capitalism.

Along the way, advertising also largely supports the cost of mass media—television, radio, newspapers, magazines, and websites.

My concern is when advertising crosses ethical lines and shades the truth. That has the potential for causing real injury to consumers.

Convert Cognition

"Covert Cognition: My So-Called Near-Death Experience" by Stephanie Savage (July/August 2015) reminded me of the movie *Jacob's Ladder.* Being an atheist, I interpreted the movie in a secular sense. "How about that; he was dreaming all that stuff!" I said to a coworker who had also been at the movie. He looked at me strangely and said, "He was in purgatory!"

Maybe this was the correct interpretation of the movie, and the title makes it seem so. Nevertheless, Savage's coma-dream makes me think of this movie.

Ernest Field
Cleveland, Ohio

Taking Exception about 'Deniers'

I take exception with the presumption that those who disagree with the global warming movement and its agenda are deniers of climate science (John Cook, "A 'Taking Back Skepticism' Campaign and Online Course," July/August 2015).

It is obvious that mankind has had an impact on climate since we discovered fire, and most dramatically since the start of the Industrial Era. It is the Doomsday extrapolation into the future that we are skeptical about, and the proposed solutions.

Global climate has cyclical variation that the global warming warners ignore. From their data merges "proving" a human cause of the warming you can deduce that without these factors, they think the rest would be flat, unchanging. This is clearly not the case, as the cycles of global ice ages and mini-ice ages attest.

The warners also ignore the ability of the Earth to self-heal, absorbing one-time climatic impacts, like Krakatoa and the dinosaur-killing meteor impact. The Earth will recover without our help, once humans have passed on or left for other places. The idea that we, the Western World, need to fix this now by using alternate energy sources and buying carbon credits is not convincing. We are skeptical that this is a worthy effort while the rest of the world is a smoking furnace of pollution. In Beijing, China, you cannot see your hand in front of your face. The proposed solutions are like shutting a tap next to Niagara Falls to save water.

Brian Hulse
Jackson Heights,
New York

Just one comment. Climatologists and other physical scientists are well aware of the many past climate fluctuations. It is their research that discovered all those past cycles. The current warming, which carries the distinct signature of human causation and is in accord with scientific predictions, is a disturbing upward trend superimposed on all those other well-known natural cycles.

—Editor

Toronto's Lamentable Course

I am a regular reader of your magazine and appreciate the work you do on a regular basis to defend science and the scientific method. I would like to draw your attention to what is happening at the University of Toronto, where a course is being offered that has no place in a institution like a university: "Alternative Health," taught by a homeopath.

I am appalled by this course being offered and by the response of the university when complaints were raised. Please visit this site for more detailed information on this subject: http://tinyurl.com/pm28rev.

Paulo Maia
Mississauga, Ontario
Canada

Accept vs. *Believe*

I believe that Reichardt and Saari misinterpreted the suggestion by Orser to use the term *accept* rather than *believe* when discussing topics such as evolution (Letters to the Editor, July/August 2015). Orser was not suggesting that such a change would result in people changing their mind about evolution but rather that the use of *accept* when we are talking about scientifically based hypotheses or theories helps make the distinction between these discussions and those that are not based in science clearer. So it makes sense to say, "I believe in god" but not that "I believe in Newton's three laws of motion." And as Orser said, the use of *believe* implies that somehow if I change my mind the situation will change. It will not. Scientific hypotheses change with new information, not because someone changes his or her belief.

David E. Anderson, Ph.D.
Meadville, Pennsylvania

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words.** Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

SKEPTICAL ANNIVERSARIES

by Tim Farley

November 1, 1755: The Great Lisbon Earthquake kills over 100,000 on All Saints Day and inspires many subsequent works of theodicy.

November 4, 1985: Over 1,500 Scientologists crowd the Los Angeles County Courthouse in an unsuccessful attempt to block the release of the secret "Operating Thetan Level III" materials. The story of Xenu is printed in the *L.A. Times* the next day.

November 5, 1975: In the book *Fire in the Sky*, Travis Walton claims he was abducted by a UFO in a national forest in Arizona on this day.

November 9, 1990: A skeptical panel on Satanic Ritual Abuse at a psychiatric conference in Chicago begins to change professional opinions of what is now known to have been a moral panic.

November 16, 2005: The TV program *South Park* airs an episode that recounts many of the secret beliefs of Scientology (such as the Xenu story) with the caption "This Is What Scientologists Actually Believe."

November 18, 1970: Linus Pauling claims megadoses of Vitamin C are effective against the common cold in a public lecture. He publishes a book on this topic later that year.

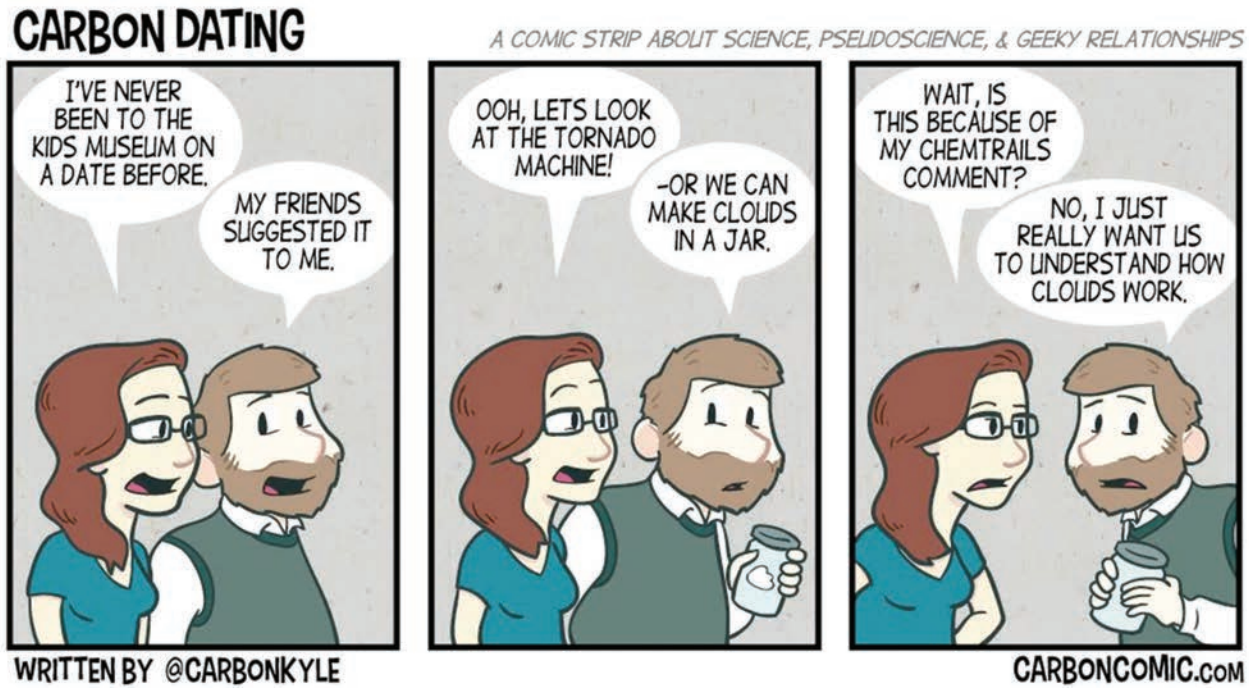
December 5, 1945: A training flight of U.S. Navy airplanes known as Flight 19 is lost in an accident, later becoming one of the key incidents of the Bermuda Triangle legend.

December 20, 2005: The ruling in *Kitzmiller v. Dover Area School District* ends the practice of mandating the teaching of "intelligent design" in public schools in the United States.

December 26, 1980: A UFO incident called "Britain's Roswell" occurrs in Rendlesham Forest starting in the early hours of this day.

December 26, 1985: In the book *Communion*, Whitley Streiber claims he was abducted by aliens on this night.

Tim Farley is the creator of the website whatstheharm.net. and blogs at skeptools.com.
He is a past fellow of the James Randi Educational Foundation.


CARBON DATING
A COMIC STRIP ABOUT SCIENCE, PSEUDOSCIENCE, & GEEKY RELATIONSHIPS
I'VE NEVER BEEN TO THE KIDS MUSEUM ON A DATE BEFORE.
MY FRIENDS SUGGESTED IT TO ME.
OOH, LETS LOOK AT THE TORNADO MACHINE!
-OR WE CAN MAKE CLOUDS IN A JAR.
WAIT, IS THIS BECAUSE OF MY CHEMTRAILS COMMENT?
NO, I JUST REALLY WANT US TO UNDERSTAND HOW CLOUDS WORK.
WRITTEN BY @CARBONKYLE
CARBONCOMIC.COM

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The organizations listed above have aims similar to those of the Committee for Skeptical Inquiry but are independent and autonomous.
Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703, Amherst NY 14226-0703.
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